TEXTILES PAPER LEATHER

AMERICAN DYESTUFF REPORTER

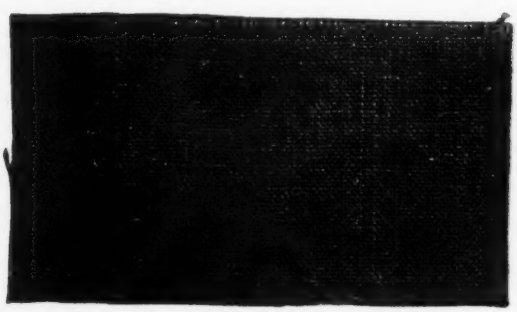
Including the Proceedings of the
AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

VOLUME XI JULY 31, 1922 NUMBER 3

GEIGY COMPANY, Inc.

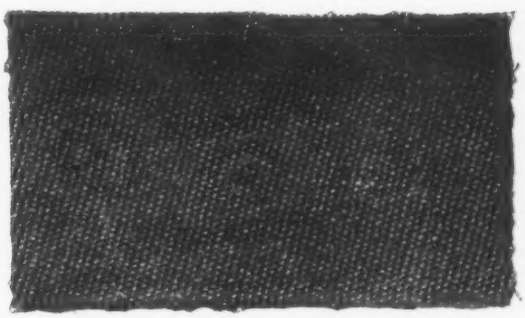
89-91 Barclay Street, New York City

ANILINE COLORS



POLAR MAROON V CONC.

This is a new dyestuff recently brought out by Geigy, which we highly recommend for wool yarn and raw stock dyeing. Its special properties are: (1) Fairly level dyeing; (2) good fastness to milling, ammonia, carbonizing, rubbing, cold water, steaming, perspiration and fair to hot pressing and potting; (3) fast to sunlight; (4) discharges white; (5) when dyed acid method cotton effects remain white; (6) when dyed neutral, cotton is stained only slightly.



DIPHENYL FAST RED F N

A Direct Color which can be used in all branches of the Cotton Industry. Possesses the following characteristics: (1) Very level dyeing; (2) good fastness to alkali, weak acids, light and hot calendering, storing; (3) is fair to mercerizing, rubbing and perspiration; (4) discharges white with Hydrosulphite; (5) on Union Goods dyes wool heavier than cotton; (6) can be dyed on wool, using chrome bottom, top chrome and metachrome processes; (7) has excellent fastness to light and fulling when dyed on wool.

Sole Selling Agents for J. R. GEIGY S. A., Basle, Switzerland
Established 1764

Main Office J. R. Geigy S. A., Basle, Switzerland; in Great Britain
The Geigy Colour Co., Ltd., 35-37 Dickinson St., Manchester

BOSTON PROVIDENCE PHILADELPHIA TORONTO COLUMBUS, GA.

A Business Motive Power

The time must come when all businesses will consider the advisability of advertising in the same spirit that a manufacturer ponders over the advisability of adopting a new machine. One does not install a piece of labor-saving mechanism because it suits his fancy; but because the efficiency of the business requires it.

He expects the new machine to reduce his cost to operate—perhaps to make a better product—and thus aid him in meeting competition and making larger profits. Advertising is exactly similar. The man who refuses to consider it as a possible expedient, simply shuts his eyes on one of the problems of his business. He might as well ignore the banks as sources of credit when he has need to borrow capital.

On the other hand, the man who looks to advertising to checkmate all weaknesses and shortcomings of his business and to carry it along to victory despite these, has a childlike faith in the miraculous.

Advertising will not make his product or his service any better than they are; but it will bring him the full benefits of their merits. It will not eliminate wastefulness in his factory or his store; but it will reduce his cost to operate. It will not make illogical selling methods successful; but it will assist good selling methods, and often point the way for improving them.

Advertising is the most inexpensive motive power that the manufacturer or merchant can buy today. It is a form of stimulus that brings excellent returns on the investment.

[**Published by the American Dyestuff Reporter in co-operation with The American Association of Advertising Agencies**]

American Dyestuff Reporter, Vol. XI, No. 3. July 31, 1922. Published biweekly by Howes Publishing Co., Woolworth Building, New York, N. Y. Domestic subscription, $5.00; Canadian, $5.50; foreign, $6.00. Entered as second-class matter Nov. 6, 1919, at the New York, N. Y., Post-office, under the Act of March 3, 1879. Copyrighted, 1922, by Howes Publishing Co.

Old Man "Good Enough" Sees the Handwriting on the Wall

OLD MAN GOOD ENOUGH was the offspring of Textile Prosperity and the parent of Waste and Inefficiency. He was old looking and infirm even at birth, but his parent Prosperity said he was "Good Enough."

Textile Prosperity pampered and stuffed Good Enough until he grew fat and more spoiled and shiftless than ever. Good Enough wasted his parent's earnings recklessly, shamelessly, thousands and thousands of dollars a year.

Quietly and unobtrusively he slunk out of the door and has not been seen since.

People warned Textile Prosperity regarding Good Enough's recklessness, pleaded with him to cast out the prodigal son. They pointed to Efficiency, a one time acquaintance of Textile Prosperity, and said, "Make him your favorite. He can save you thousands of dollars which Good Enough is now wasting." But Textile Prosperity turned a deaf ear to all these pleadings, and answered with a smug smile, "I'm making lots of money. I guess Good Enough is 'good enough for me.'"

But there came an end. Textile Prosperity sickened from too much of everything and died. He was succeeded by Depression, who remained in authority for many months and who still pampered Good Enough, partly from precedent and partly because he was too weak to do otherwise.

Then Efficiency, who had been growing weak from neglect and inactivity, began to realize the great need for his guiding hand and by an heroic effort pulled himself together and took command. He assembled about him those who had previously advised Textile Prosperity in vain and found in their words much that was good; particularly from one named Franklin Process:

"It is now costing you around 7 cents per pound for winding. By eliminating the old, expensive, wasteful methods of backwinding, such as from skeins and chain warps and substituting my simple, direct method, I have in many cases saved as much as 5 cents per pound in the winding room. With your production of a million pounds a year, this saving would amount to $50,000.00.

"Perhaps in your case the saving will only be 2 or 3 cents per pound, but even so, the annual saving will be worth while, and then you have a saving of 50% in floor space, 50% or more in fuel and water, due to the short dye bath, —1 gallon of liquor to a pound of yarn —and——"

Old Man Good Enough did not wait to hear. He saw the handwriting on the wall and realized that his days of special privileges were over. Quietly and unobtrusively he slunk out the door and has not been seen since.

It is rumored that his offsprings, Waste and Inefficiency, will follow him shortly. *Are YOU interested in saving thousands of dollars a year? If so, we suggest that you write us for complete information regarding Franklin Dyeing Machines. If they are adaptable to your business we can show you how they will effect remarkable economies and can cite many cases where they have already done so.*

Franklin Machines are used to dye fine single worsted yarns that cannot be dyed by any other process, fine splicing cotton yarns for hosiery, hard twisted cords for tire fabrics, fire hose and cable cords, Merino yarns, worsted yarn on jackspools, glazed yarns and soft yarns for electric wire covering, cotton yarns for shirtings, voiles and dress goods, etc.

FRANKLIN PROCESS CO.
Philadelphia PROVIDENCE Manchester, Eng.
N. Y. Office, 72 Leonard St.
SOUTHERN FRANKLIN PROCESS CO.
Greenville, S. C.

"SILK BROWN G"

A new, level dyeing, fast acid color for Wool or Silk Also an excellent neutral dyeing color. Dyes Silk or Wool in neutral or even in slightly alkaline bath.

Heretofore the shading of light colors on silk or wool in a neutral bath was usually accomplished with red and yellow, with results far from satisfactory.

"SILK BROWN G" brings relief to the union dyer as a mellow brown to shade greys and light fancy colors on silk or wool in union, as well as a ground color for Tan, etc. Is extremely level dyeing either when dyed in an acid bath or neutral bath.

"Silk Brown G"

Manufactured only by

ALTHOUSE CHEMICAL COMPANY, *Office and Plant: READING, PA.*

F. E. ATTEAUX & COMPANY, Inc.

172-178 Purchase Street, Boston

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Manufacturers of

ACID—CHROME—DIRECT and SULPHUR COLORS
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HAEMATINE CRYSTALS AND ALL DYEWOOD PRODUCTS

F. E. ATTEAUX & COMPANY, Inc.

BOSTON NEW YORK PHILADELPHIA CHICAGO

HOWES PUBLISHING CO.,
Woolworth Bulding, New York.

.....192...

Please enter my subscription for the American Dyestuff Reporter for one year from date, for which you may bill me $5.00.

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Leave Silk White

Pontachrome Yellow SW
Pontachrome Red B
Pontachrome Brown SW
Pontachrome Green GLO
Pontachrome Blue R
Pontachrome Violet SW
Pontachrome Black SW
Pontachrome Black SWB

These colors will meet the fastness requirements for the men's-wear trade.

E. I. du Pont de Nemours & Co., Inc.
Dyestuffs Department
WILMINGTON, DELAWARE

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The Original

BLEACHING OIL
for boiling out Cotton, to produce a foundation for a Pure White

High Grade Sulphonated and Saponified
CASTOR OIL PRODUCTS

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Solvents and Assistants for cleaning all Textiles

B & L Bleachers' Bluings and Tints

Works and Office, ATLANTIC, MASS.

MAKING dyes like the pre-war types is no great achievement, for research carried out in America, on pre-war colors, shows that many desirable qualities can be added by improved production methods. We are not satisfied with making "just as good" dyes and that's why our—

Chrome Blue Black M P
Chrome Fast Black S W
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are the best dyes of their kind on the market. Send for samples and prove this for yourself.

Byron, Heffernan & Co.
Elizabeth **New Jersey**

KROMEKO FAST YELLOW C G W

(Not Heretofore Made in America)

Very fast to light, fulling, carbonizing and steaming
A splendid product for wool raw stock and yarns

PRICED VERY LOW

AMIDINE FAST YELLOW 4G
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Two Direct dyeing Yellows which are fast to alkali, acid and light

RECOMMENDED FOR

- *Padding of Cotton Piece Goods*
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Atlantic Patent Black

is the accepted American Standard of Sulphur Blacks. It possesses greater solubility, greater strength and greater brilliancy.

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REG. U. S. PAT. OFF.
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FOR—PIECE DYEING,
YARN and RAW STOCK

ARKANSAS CO., Inc.

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QVALITY COLORS
UNITED STATES COLOR AND CHEMICAL CO. INC.

Anthranol Chrome Blue Black AR

Dyes chrome mordant or top chromed. Recommended for fast shades of navy blue or all classes of stock. On account of its shade, level dyeing properties and solubility it is especially suitable for piece dyeing

Anthranol Chrome Brown W

Dyes chrome mordant or top chromed. Is fast to light and fulling. The most level dyeing brown on the market.

Acid Chrome Blue F 4 B

Similar to the pre-war Chromotrope F4B. Of special interest for dyeing piece goods to leave silk white.

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on
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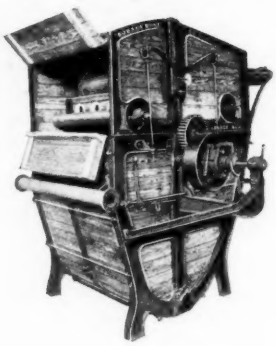

(Ask for Booklet 221)

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Woolens, Worsteds, Cottons, Knit Goods

Rodney Hunt Machine Co.
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ANILINE DYES FOR ALL TRADES

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Bleachers!

Satisfaction

By turning out goods to satisfy the consumer you also satisfy your Selling Agent.

The consumer wants White Goods that stay white--and strong—, and you know they can only be produced at same cost by Peroxide Bleaching.

THE ROESSLER & HASSLACHER CHEMICAL CO.
New York

The American Legion Employment Committee

N. Y. COUNTY

has operated an Employment Bureau exclusively in the interest of ex-service men with Honorable Discharges since January 16th, 1922,

———at———

412 West 33rd Street, New York City. **Telephone, Watkins 9013-9014**

OUR RECORDS SHOW

60% of all applicants are married.
70% come from the State of New York.
30% are members of the American Legion. Average age 29 years.
25% of all applicants have been placed in temporary positions.
32% of all applicants have been placed in permanent positions.

It costs this Bureau $4.50 to place a man in a position. No charge is made to the employer or the man.

400,000 Ex-Service Men Are Out of Employment in the United States.
75,000 Ex-Service Men Are Out of Employment in New York State.
45,000 Ex-Service Men Are Out of Employment in New York City.

These men "carried on" to bring Victory and Peace to YOU.
Help them to "carry on" for themselves.

WILL YOU HELP?

Will You Give Preference to Ex-Service Men When Filling Vacancies?

If you are located in a city where this Committee cannot co-operate fill out the questionnaire below and mail it to the Local Organization of the American Legion.
If you are located where you can help the ex-service men through this Committee, mail it to us.

FILL OUT THE QUESTIONNAIRE BELOW:

Have you a position for a World War Veteran?.....
Nature of employment?..... Remuneration .....
Where located? .....

(If you do not employ direct, you may know some one who does and has a position open. If so, use spaces below.)

Name ..... Telephone .....
Address .....

(Signed) ..... Telephone .....
Address .....

ANOTHER WAY YOU CAN HELP

This is a DIRECT APPEAL for $5. This is the reason: Overhead expenses show that it costs, approximately, $4.50 to place a man in a permanent job. We need funds to better and increase our service. All checks and money orders should be made payable to AMERICAN LEGION EMPLOYMENT COMMITTEE and sent to 412 West 33rd Street, New York.

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ALL SHADES

FROM SKY BLUE TO BRILLIANT REDDISH TYPE

These products are especially adapted to all kinds of dyeing where a better grade of Sulphur Color is required

They are distinguished by their excellent solubility, fastness to light, washing, rubbing, alkali and acid.

MADE BY

TOWER MANUFACTURING CO., Inc.

DYESTUFFS DEPARTMENT

SALES OFFICE AND FACTORY

85 to 105 DOREMUS AVENUE NEWARK, NEW JERSEY

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Dyeing-Bleaching-Scouring Machinery

There are K-W machines in use which were built nearly half a century ago and which are still doing their work efficiently and economically under severe service. This is sufficient evidence of the durability and capability of K-W Machines after long years of subjection to the ravages of live steam, heat and alkalis.

K-W Machinery by its accomplishments has steadily and irresistibly built up a reputation that has made the name "Klauder-Weldon" synonymous with the **"world's best dyeing, bleaching and finishing machinery."**

Our interest in upholding the K-W reputation means that you MUST be satisfied, and our suggestions to prospective purchasers are made with the view toward solving any dyeing, bleaching or scouring problem for all time. We will be glad to answer any and all questions without obligation on your part whatsoever.

Write today for K-W Literature

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Bethayres, Pa., U. S. A.

H. G. Mayer, Southern Agent,
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Calling a Spade a Spade

National Erie Fast Scarlet YA
NATIONAL ERIE FAST SCARLET YA
Properties
Solubility Good — Level Dyeing Excellent
Fastness to
Sunlight . . . . . Good
Washing . . . . . Moderate
Perspiration . . . . . Moderate
Hot Pressing . . . . . Good
Chlorine . . . . . Moderate
Organic Acids
Mineral Acids
Alkali
Rubbing
Storing
MANUFACTURED BY
NATIONAL ANILINE & CHEMICAL Co

WHEN the National Aniline & Chemical Company, Inc., announces a new dye it issues a New Dye Bulletin showing dyed swatches of the color in different percentages and on different materials, the method of application, and stating the properties of the dye under various fastness tests.

The description of these fastness properties is strictly accurate and may be depended upon by the dye user.

If a dye is of "excellent" fastness, the description so states; if the fastness properties are only "moderate" or "poor," that also is frankly stated.

National Aniline and Chemical Company, Inc.

New York *Chicago* *Charlotte* *Toronto* *Philadelphia*
Boston *Hartford* *Montreal* *Providence* *San Francisco*

AMERICAN DYESTUFF REPORTER

"Circulated Everywhere Dyestuffs Are Used"

Devoted to the practical application of dyestuffs in all industries; especially to textile chemistry—the science and practice of scouring, bleaching, dyeing and finishing.

VOLUME XI | NEW YORK, JULY 31, 1922 | NUMBER 3

A Consideration of the Various Substances Used in the Construction of Dyeing and Bleaching Utensils and Apparatus

Part II

Monel Metal a Natural Alloy—Physical Properties and Application in the Dyehouse—Wool Dyeing—Silk Dyeing—Cotton Dyeing—Bleaching Compounds—Monel Metal for General Uses in the Textile Industry

By H. GRANDAGE and W. E. HADLEY

Illustrations courtesy International Nickel Company, New York

Monel Metal

In an article appearing in the preceding issue of this magazine, mention was made of the various substances used in the construction of dyeing and bleaching apparatus, of which many materials have been tried with more or less success. None, however, has met with the widespread popularity which has attended the use of Monel Metal.

Monel Metal consists of approximately 67 per cent nickel, 28 per cent copper and 5 per cent of other metals, and may well be considered as a natural alloy inasmuch as the principal metals, nickel and copper, exist in the same general condition and quantity in the crude ore as they do in the alloy after refining, the refining process serving to remove only those elements which are undesirable.

The mines from which this natural alloy is obtained are located in Canada, in the Province of Ontario, and are owned by the Canadian Copper Company, who are a subsidiary of the International Nickel Company.

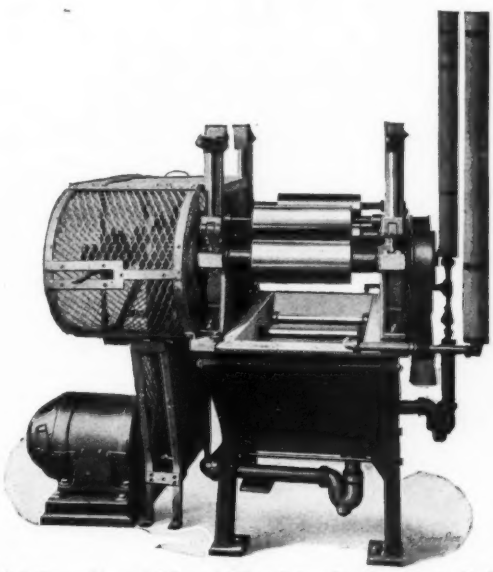
The ore is treated at the smelter, where it assumes the form of "Matte," after which it is shipped to the United States for the final refining and manufacture.

Physical Properties of Monel Metal

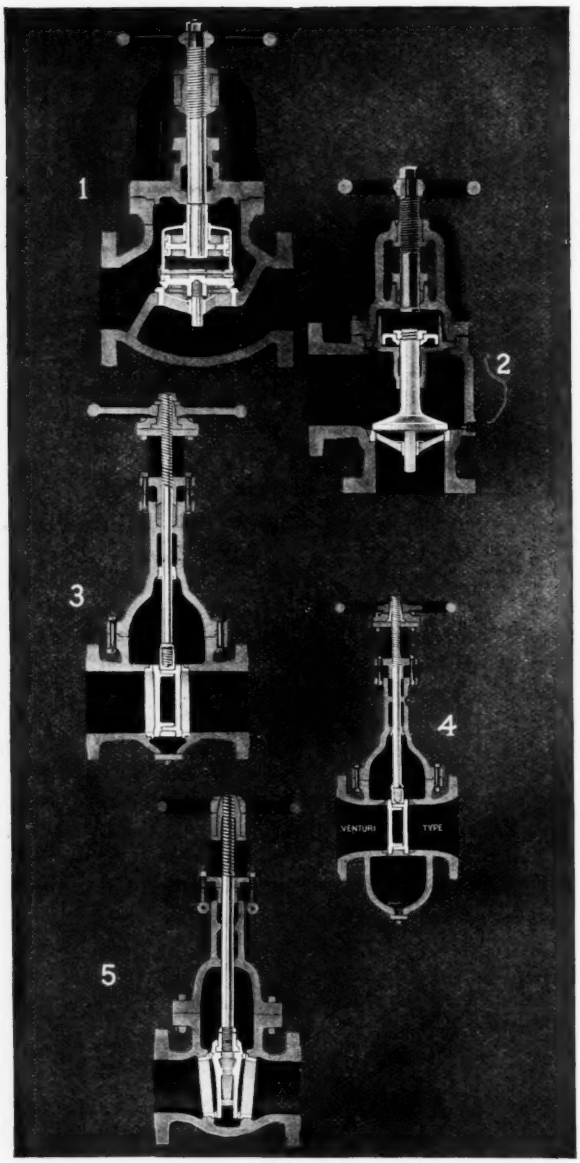
Monel Metal is extremely strong, having a strength equal to that of steel, but the properties which render it most valuable for use in the textile industry is its non-corrosive and non-oxidizing nature.

Some of the physical properties of Monel Metal are as follows: It has a color very much like that of pure nickel; it is capable of retaining a high polish; its melting point is 1,360 deg. Cent. or 2,480 deg. Fahr.; it has a specific gravity (cast) of 8.87; the heat conductivity of Monel Metal is 1/15 that of copper. Monel Metal is extremely tough, is ductile, is readily welded or brazed, either by oxy-acetylene or electric process, is easily machined, and can be soldered as desired.

Monel Metal retains its strength at very high temperatures and for this reason is particularly adapted for the



Special Dye Jig of Monel Metal in the Du Pont Laboratory, Wilmington, Del. Textile Finishing Machinery Company, Providence, R. I.



Some Typical Sections of Monel Metal Trimmed Valves for Superheated Steam. 1. *Edward Valve & Mfg. Co.* 2. *Foster Eng. Co.* 3 *and* 4. *Chapman Valve & Mfg. Co.* 5. *Pratt & Cady*

manufacture of valve parts which are subjected to the action of superheated steam.

Monel Metal is particularly valuable for use in the dyehouse, owing to its long life under adverse conditions. The extreme ease with which it can be cleaned after use, due to which fact a single piece of apparatus can be used for a variety of colors, the outfit only needing a thorough cleaning following the dyeing operation, renders it very desirable.

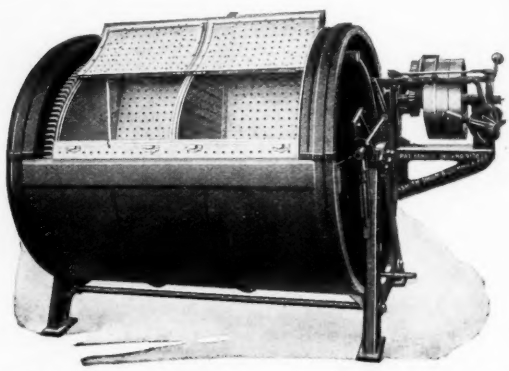
Wool Dyeing

Use of Acid Dyes.—Monel Metal finds extended use in the dyeing of textile material. In this connection it is well to note that the Acid Dyes used in wool dyeing can be very successfully applied in the presence of this alloy. It successfully resists the action, in dilute solution, of such acids as acetic and sulphuric, which property is very necessary when dyeing with the above mentioned class of colors.

Use of Mordant Dyes.—The Chrome dyestuffs, used in the dyeing of wool, in conjunction with the metallic mordants, yield very satisfactory results.

Silk Dyeing

The hot "boil-off" liquor, so necessary in silk dyeing, is without effect upon Monel Metal, and this fact makes the metal very valuable for this type of work. Furthermore, the various dyes and acids required in the dyeing



Rotary Type Dyeing Machine with Monel Metal Cylinder That Has Seen Continuous Service for Eleven Years. Smith, Drum & Co., Philadelphia, Pa.

of silk, and in the subsequent processes of imparting the necessary scroop to the finished material, are without action upon Monel Metal. The weighting of silk by means of the tetrachloride of tin is readily accomplished in the apparatus composed of this alloy.

Cotton Dyeing

The Direct Cotton colors applied as a direct dyeing, or those which are diazotized and developed, work very satisfactorily in the presence of Monel Metal. Common salt, Glauber's salt and sodium carbonate required in the processing of the Direct Cotton colors are without action upon this metal. Direct Cotton colors may be after-treated with copper sulphate, potassium bichromate, etc., without injury to the material being dyed or to the apparatus.

Use of Basic Dyestuffs.—Monel Metal has not been found suitable for the mordanting of material with tannic acid prior to the use of basic colors.

Use of Sulphur Colors.—The use of Sulphur colors in Monel Metal apparatus does not apparently yield entirely satisfactory results, although where not too heavy a percentage of sodium sulphide has been required, in-

stances have been noted where quite satisfactory results have been obtained.

Use of Reduction Vat Colors.—The use of Reduction Vat dyestuffs in Monel Metal apparatus produces excellent results.

Action of Monel Metal in Conjunction with Bleaching Compounds

Use of Chlorine Bleaching Liquor.—The use of chlorine bleaching liquor prepared from bleaching powder (calcium hypochlorite) does not yield satisfactory results and should not be employed in this capacity. When the chlorine liquor is prepared by absorbing liquid chlorine in soda ash or caustic soda solution, the use of Monel Metal yields very fine results.

Use of Peroxide Bleach Baths.—Considerable work has been done with the peroxide bleach baths in Monel Metal containers, and the results obtained would seem to indicate that this alloy should prove of very real value for this type of work.

Monel Metal for General Use in the Textile Industry

Monel Metal is finding an increasingly active field of usefulness in the textile industry, being used for those parts of washing and scouring machines which are exposed to the action of various chemicals, where ordinary types of material would be rapidly disintegrated.

Carbonizing may be successfully carried out with no danger to the apparatus or material.

Crabbing is readily accomplished, and there is no danger of rust appearing from the rollers.

Dyehouse Steam Kettle, Batch Kettle and Dipper of Monel Metal. C. E. Sholes, 80 Maiden Lane, New York

Monel Metal also finds use in hydro-extractors, pumps, pipe fittings, skein dyeing machines, and for the various kettles, paddles, etc., in constant use in a well regulated dyehouse.

The manufacturers of laundry machinery have found Monel Metal to be particularly adapted to their needs.

(*Part III will follow in an early issue.*)

Efficiency in the Worsted Dyehouse

Planning Daily Work Ahead—Handling Dangerous Chemicals—Temperature—Supervision of Sample Swatch Dyeing—The Dyehouse and Its Relation to the Mill

By B. T. C.

(*Concluded from page* 41.)

As is the case in all mills, certain kettles should be allotted to light and mode shades and certain others to navies, browns and blacks, etc. If it is necessary to dye a light shade in a kettle that has been used previously for a navy or black it must be cleaned before the set is thrown in. There are several methods of cleaning kettles. Three or four pails of Glauber's salt may be poured into the kettle, water run in and the temperature raised to a boil. The boiling should continue at least twenty minutes, during which time the winch should be scrubbed with a long-handled stiff brush. In some cases a half pail to a pail of ammonia, depending on the size of the kettle, is added to the water and raised to a boil as before. One dyer has successfully cleaned kettles with bleaching powder solution (standing about 8 deg. Twaddell). Care must be taken that no undissolved particles of chloride of lime are poured into the kettles. Furthermore, the machines must be boiled out again with water to remove all traces of the bleaching powder solution.

The daily work should be planned during the previous afternoon by the dyer and his assistants. Special hurry pieces naturally have first consideration and then the regular work. At this point it might be well

to mention repairing and redyeing. If possible the dyer should take care of all rejected pieces as they are sent back daily from the rough perch. In this way there is no accumulation of rehandles and the extra work involved is taken care of much more easily. The formulae should all be figured out during the same afternoon and to save time the dyestuff should be weighed out in the drug room. Dyeing instructions should be given to the floor foreman so that they may control the next day's work more efficiently.

In the morning the pieces should be thrown into the kettles. A sufficient number of sewing machines should be available so that there is no unnecessary waiting. A good scheme is to pick out a few of the men who sew the quickest and allow them to sew up all the pieces. This will often save time, especially in a large dyehouse.

Systems in mills vary but it is a good plan to allow the color mixer to be in charge of acids and chemicals as well as dyestuffs. If kettle hands weigh out their own acid or Glauber's salt there is apt to be more mistakes for one thing, and greater waste for another. Glauber's salt if it comes in bags should be emptied into a large wooden salt box and the pails filled inside the box. If the men fill their pails from the bags a large amount of salt falls to the floor and becomes too dirty to be used with any degree of safety. It is well in adding Glauber's salt to the machines to place it in several strong cotton bags whose open ends are tied securely with strong rope. In this way the bags hold back all insoluble foreign material such as nails, splinters and dirt, or anything, in fact, which might possibly get into the kettles and tear or stain the goods. The bags should be tied securely, one on each side of the kettle. In any event, they should be kept clear of the steam pipes.

The workman should be instructed very carefully in the use and handling of acids and of sulphuric acid in particular. Vitriol [H_2SO_4], as it is generally called in the trade, comes to the mill in carboys containing about twelve gallons. In trucking carboys of vitriol it is quite dangerous to use the ordinary type of warehouse truck because there is no means of holding the container in place. However, several types of trucks are on the market which are safe to use. One has a fork arrangement, "one prong of which passes on each side of the carboy box and beneath the side cleats." This type of truck lifts the carboy clear of the floor and can be operated successfully by one man. Under no consideration should the men be allowed to pour out acid by hand. It is best to use the ordinary type of inclinator, only taking care that the carboy is held firmly in place. The men should be instructed never to add water to the concentrated vitriol, but rather vitriol to water. The danger of using hot or even warm water with vitriol should be carefully explained. So much for chemicals.

Every kettle hand should be supervised closely when he dissolves his dyestuff and adds the solution to the dyeing machines. Perhaps the best scheme is to boil up all colors except blacks possibly. Steam jacketed copper kettles of about five gallons capacity have been recommended, but many dyers like to avoid all utensils of copper, especially when chrome colors are being used. An economical means of accomplishing the same results consists of cutting a number of strong wooden barrels in halves. These half barrels should be placed on a wooden stand or framework high enough above the floor to permit one's placing a pail and sieve under a spigot inserted in each tub. Steam pipes should be carried into each half barrel. The dyestuff and a suitable quantity of water should be poured into the tubs, the steam turned on and the contents stirred at a boil until all the color is dissolved. The solution is then sieved into the pails and added to the kettles. A certain number of tubs should be assigned to navy shades, others to greens, browns, reds, etc. Blacks do not require such treatment (we are speaking altogether of acid colors) and light and even medium shades often may be boiled up in pails, sieved in the usual manner, and give good results. Some mills use such kettles only for shades which give them the most trouble, while others even boil up medium and light shades.

Control of temperature has been mentioned in a previous paragraph and will be touched upon here only as it concerns the actual dyeing process itself. "Bring the batch to a boil in one hour" is rather a loose order and it often makes all the difference in the world as to how this is done. In carrying out the above order one operator might regulate the steam valve in such a way that the temperature is 130 deg. Fahr. at the end of half an hour and then, realizing that he must come to a boil within the next thirty minutes, might increase the steam. And all the damage due to too rapid absorption of dyestuff may possibly occur between 130 deg. and the boil; in other words, within the very limits wherein the most caution in dyeing should be observed. Another operator might raise the temperature to 140 deg. Fahr within fifteen minutes and then, also realizing his mistake, this time in coming too quickly to the boil, might reduce the amount of steam and yet reach 212 deg. Fahr. within the allotted hour. These are two extremes, but they illustrate quite clearly the great variety of temperature control irregularities due to having unskilled labor. Of course, the foremen should watch the steam valves carefully, but in spite of all that can be said or done such occurrences happen all too frequently. All of this is simply another argument in favor of having automatic thermostatic units attached to each kettle.

In all events it is very difficult to establish rules to govern such instances. Everything, of course, depends on the dyestuffs. However, the dyer should be familiar with the colors which he is using and should know the temperature at which a particular color "feeds on" rapidly. That temperature is the beginning of the danger period in dyeing and must be closely

observed. With such knowledge the dyer should be able to control efficiently the time of raising each dye bath to the boil.

In the dyeing of tops a thermometer may be used to great advantage. The following illustration will explain this point: Let us assume that a top-dyeing machine has been filled to capacity, water added, the pump started, and that the necessary amounts of acetic acid, color and Glauber's salt have been added. The bath is to be brought to the boil in one hour and thirty minutes. Let us also suppose that the combination of dyestuffs in question goes on the fiber rapidly from 170 deg. Fahr. on. The dyer knowing this would probably give orders to raise the temperature to 130 deg. Fahr. within fifteen minutes, to 150 deg. Fahr. within twenty minutes, to 170 deg. Fahr. within ten minutes, and to the boil within forty-five minutes. Note that from the temperature of the cold bath to 160 deg. requires but thirty-five minutes, while from 160 deg. to the boil requires nearly an hour. By so controlling the temperature the dyer saves time at the start of the operation where there is no particular danger, and utilizes it to his advantage at the point at which the danger of unevenness begins.

One of the causes of unlevel dyeings is bringing the dye bath to a boil too quickly. The above illustration explains why such a thing is possible. While much has been written by textile chemists and dyers concerning the use of proper chemicals and dyestuffs in the production of good results, a great deal more remains to be said about temperature and its control in the dyehouse.

The dyeing of swatches or patches out as samples for the dyer also must be closely supervised if efficient results are to be secured. In many mills the sample is simply placed between the folds of a piece of white cotton cloth, held firmly against a steam pipe and dried. The danger of using such a method of drying lies in the fact that often a shine is developed, rendering it difficult for the dyer to match with any degree of accuracy. To overcome this defect some dyers insist that the folded cloth containing the wet samples simply be wrapped about the pipe and held in place with a piece of twine. Perhaps the best plan is to dry the swatches in the so-called steam box. This is simply a covered wooden box, two feet long, one foot wide and one foot deep. At the bottom lies a steam coil controlled by a valve outside the box. About three or four inches above the coil a piece of ordinary wire gauze is fitted, upn which the samples are laid out flat and dried.

Drying has for its purpose the removal of all excess moisture, as the least amount held in the sample affects the shade considerably. At the same time dyers have all noticed that the heat applied in the drying also alters the shade. Usually it is reddened. For instance, yellow shades appear more on the orange side and oranges more on the scarlet. On cooling the shades tend to come back. Reds tend to grow bluer, and so on. This alteration, of course, takes place gradually. From the above facts it will be seen that the drying of samples for matching is quite important if uniform results are to be obtained. A sample should never be accepted, especially when a close match is required, if it contains the least amount of excess moisture or if still warm from drying. Of course, there is hardly any need to mention the necessity of having good northern light in the dyer's office. The necessity for excellent lighting conditions for such work is perfectly obvious to all.

All dyers are more or less familiar with the difficulty of bringing out each set exactly identical in shade day after day. A set of pieces may match the standard almost perfectly and still if that set is compared with one dyed, say, a week before, it will be slightly more green or red, as the case may be. One method of reducing such slight differences is to keep samples of each set dyed. They should be properly ticketed, bearing the style number, piece number and date of dyeing. Then as the dyer matches his samples to the standards and compares them with previous work he automatically checks himself and secures more uniform results.

Needless to say, when additions are made to the dye bath to bring a set up to shade only the most level dyeing colors which dye the fiber uniformly at a boil should be used. To attempt the use of any other type of color is pure folly. The kettlemen should be watched very closely at this point and should be cautioned to distribute the color uniformly and not to spatter the concentrated liquor on the pieces. It is well also to allow the set to run without steam for five to ten minutes in order that the added color may mix thoroughly with the rest of the liquor.

Too much stress cannot be laid upon the need of efficient rinsing after the pieces have been dyed. Unless the rinse is carefully controlled clouds and streaks may result. With most light-weight dress goods there is not usually much danger, but with many of the heavy-weight coatings dyed with acid colors clouds occasionally occur. All have noticed that with heavy fabrics the outside frequently feels cool while the inside—especially in the case of tacked pieces—remains warm. The best method of rinsing consists in washing off with warm water until the pieces are hand warm, after which cold water should be added until the set is cold and clean. In some mills large boxes six feet long, four feet wide and deep, are built on a wheel base and may be moved from kettle to kettle as desired. A large reel turned by hand is fitted to the box on suitable uprights. The vat is filled with cold water from a length of rubber hose capable of reaching a number of dye kettles, after which the seam of one of the hot dyed pieces is opened, and the end thrown over the reel. The winch of the dye kettle is started, a man at the same time turning the hand reel of the box. In this manner the piece is run into the box and cooled suddenly. It is run back and forth over the reel until perfectly cold, after which it is taken out and thrown into a dye kettle filled with cold water and washed

until clean. Piece after piece is thus taken out one at a time and treated as we have described. Dyers who use this method for washing their heavy goods recommend it highly.

After the goods have been properly washed they may be removed from the kettles, care being taken that clean trucks or boxes only are used for light and mode shades. As soon as they have been taken out of the kettles each set should be trucked out of the dyehouse. If allowed to remain specks of color floating in the air may stain the pieces or drops of oil and condensed moisture may cause spots. Having finished with the dyeing itself the dyer should extract and send his goods to the dryhouse as quickly as possible.

The Dyehouse and Its Relation to the Mill

For a dyehouse to be really efficient it must have the closest sort of co-operation with a number of other departments of the mill. The laboratory, of course, is of great importance to the dyer. With the aid of the mill chemist a dyer is able to control dyeing far better than if working alone. The testing of new dyestuffs and the studying of their properties; the controlling of purchasing by checking up the money value of dyestuffs as brought against known standards; the testing of the various acids and chemicals used daily in the dyehouse; the studying of fastness properties of colors; these, together with the consideration of mill problems as they occur and research, all come under the direct control of the chemist. The results obtained naturally are of great value and interest to the dyer.

Between the finishing and dyeing departments close co-operation also should exist. The finisher should first see that each piece is sent to the dyehouse clean. That is of paramount importance. The duty of the dyer is then to dye those pieces properly, seeing that each set is up to standard. After the dyed sets have been examined and a number of pieces are found cloudy or shaded, the dyer and finisher, with the superintendent as a neutral party, should get together and determine the cause of such poor results. The whole matter should be threshed out thoroughly until the blame is placed where it belongs. After the cause has been determined steps should at once be taken to correct it. "Passing the buck" accomplishes nothing. Too often it is the case of the finisher blaming the dyer for poor results obtained, and the dyer retaliating by blaming the finisher. This is no way in which to solve the problem and efficient work can never be had until each department places all of its cards on the table face up. The main idea is not to place the blame on any one department, but rather to correct the tendency for such work to reoccur in the future.

The dyer, of course, should also be in close touch with the purchasing agent. He should keep the latter well informed as to his need for dyestuffs and chemicals. Both men should be familiar with the amounts of color on hand in dyehouse and storeroom. There is very little excuse, as a rule, for the occurrence of a dye shortage in these times.

And finally, the dyer and designer should work together more than is generally the case. These two departments, together with finishing, should work hand in hand in the production of new fabrics and color lines. The designer with his knowledge of weaves and fabrics, the dyer of color, and the finisher of the numerous finishes when co-operating as they should will together produce more marketable goods than if each one worked alone without realizing what really was desired in the finished product.

Conclusion

Efficiency really is the result of method. Departments make good not because their chiefs are endowed with more brains than ordinary, but rather because these men have adopted the correct method of supervising their work. All men may follow the same method if they will. In closing we will sum up the most vital points brought out in this paper, noting those which tend to elevate a dyeing department to a more efficient plane.

For a dyehouse to be operated efficiently—

1. Working conditions should be healthful, with good light and plenty of dry fresh air.

2. Labor should be supervised properly.

3. Temperature should be controlled, and wastage of steam prevented.

4. Soft water should be used both in scouring and in dyeing.

5. Gray goods should be sent to the dyer absolutely clean and free from soap.

6. The most progressive methods of dyeing should be used.

7. There should be close co-operation between the dyeing department and the laboratory, finishing and purchasing departments.

Success has been said to be "the habit of doing things right." This applies just as truly to dyeing as to anything else.

COLORING WEBS BY SPRAYING

By F. Erben

Webs of material are colored by means of a spraying nozzle, which is caused to move at right angles to the web, each movement taking place while the web is at rest. The colored portion is drawn off intermittently, so that separate parallel strips of color following one another are laid on the web across its whole width. The movements of the nozzle and the web are effected by specially designed mechanism.—Brit. Pat. No. 157,328, 1922, through "Jour. Soc. Dyers & Colourists."

Dyeing Viscose Silk

Varieties of Artificial Silk—Preparation of Viscose Silk—Strength of Fibers in Dyeing—Affinity for Dyes—Direct Cotton Colors—Basic Dyes after Mordanting—Topping—Behavior of Certain Dyestuffs

By GEORGE EMMONS

IN order to understand certain precautions used when dyeing artificial silk of the viscose variety and in dyeing mixtures containing this silk, it will be advisable to have some information as to the construction of the artificial fiber and as to its behavior under various condition.

There are several varieties of artificial silk, although it is the viscose kind that has become predominant. First, there is Chardonnet silk, sometimes called collodion silk. This is a product of the nitration of cotton; that is, the fiber is obtained by a treatment of a solution of nitrated cotton in a mixture of ether and alcohol. The filament obtained is nitrated cellulose. This is given a denitrating treatment with a solution of ammonium sulphide or an equivalent. The fiber as it comes into the market is cellulose; that is, a pure form of cotton.

Another form of artificial silk is made from a solution of cotton in ammoniacal copper oxide. The copper may be eliminated and a pure form of cotton left by applying an acid solution. This is done after spinning.

Then, there is the cellulose acetate silk manufactured in England, and perhaps elsewhere.

Viscose silk may be prepared by treating cotton or purified wood pulp—that is, cellulose—with strong caustic soda and carbon disulphide. The filaments are obtained from the solution. Then, after spinning, the sulphur compounds and salts are removed. The fiber finally consists of approximately pure cellulose.

In whatever way artificial silk is prepared, it seems that it eventually consists of nearly pure cellulose. This is really hydrated cellulose. The fiber may be very long and very fine. There is splendid luster, which may excel that of the real article.

Unfortunately, however, artificial silk has one or two bad qualities. Real silk is quite strong in its resistance to a pulling action. That is, it has a high degree of tensile strength. Even when wet, this tensile strength remains, though perhaps somewhat reduced. Artificial silk, on the other hand, suffers a very heavy reduction in its tensile strength when it is wet. This is apt to make trouble in the dye bath.

In fact, it is one of the principal things to learn in connection with the dyeing and bleaching of artificial silk. The fiber weakens greatly right in the bath, so that it becomes necessary to handle it with a great deal of care. This means carefulness from a mechanical point of view. Further, the elasticity of artificial silk is less than that of the real article. Artificial silk immersed in alkaline solutions, particularly hot ones, is more or less subject to a disintegration because of the dissolving effect produced by the alkali. Consequently, it is often very necessary to use solutions that are less than hot and to avoid strong alkalies.

There is an offset to some of the foregoing drawbacks. Artificial silk is eager for dyestuffs and is often capable of being dyed at a low temperature. The dyer may or may not need to bleach the artificial silk. Ordinarily, the process of manufacture is so carried on that bleaching will already be done when the fiber comes to the dyer. On the other hand, this is not always the case. The artificial silk may be in a raw condition and have some color. However, the slight yellowish brown may often be negligible. Thus, if the color is to be a heavy one there may be little or nothing gained by bleaching out the yellowish brown. But the color required may be a delicate light shade. Then bleaching may be very desirable, if not absolutely necessary.

The bleaching may be done with a weak solution of chloride of lime. The procedure is carried out in the same manner as if cotton were the fiber being treated. After this treatment, the artificial silk is soured in a weak solution of an acid, and finally soaped in a lukewarm solution of soap.

It may be set down here that cellulose acetate silk as produced by at least one British concern is claimed to retain its strength and elasticity to a considerable degree after it has suffered immersion.

In general, viscose artificial silk is dyed with direct cotton dyes. The bath is made up with a reduction in the amount of liquor; that is, it is a short one. From 5 to 20 per cent of the weight of the fiber is added in the form of Glauber's salt. The temperature is maintained at about 120 to 140 deg. Fahr. If the shade is to be a light one, the Glauber's salt may be used to the extent of 10 per cent and 5 per cent of soap added to the bath. The period of dyeing for medium and heavy shades may amount to about one hour. Monopole oil (soluble oil) is often put into the dye bath for the purpose of facilitating evenness of dyeing. It also promotes softness of feel, so it is believed.

A source of unevenness consists in the want of uni-

formity existing in the physical condition of the fiber. Thus, the spinning may have made some locations denser than others. Under such circumstances, it will hardly be the dyer's fault if sometimes the result is an uneven shade.

Many of the basic dyes may also be employed to dye artificial silk. Likewise, certain of the acid dyes may be used, though one is scarcely to expect fastness against washing.

When it is preferred to use a basic dye, the artificial silk may properly be wet out in water at a blood heat; that is, in water which is to the hand neither warm nor cold. The dye bath is made neutral and the dyeing is done in about one hour at 85 deg. Fahr. The temperature may be pushed up to blood heat, if necessary. Only, this higher temperature is apt to add to the difficulties in handling. The dyestuff should first of all be carefully dissolved in a small amount of water, and then added in instalments to the dye bath. The object here is to prevent too rapid an absorption of the dye and the consequent unevenness of shade. Acetic acid is to be added to the water employed both for the dye bath and for the dye solution, if the water available is naturally hard.

Where skeins of artificial silk are to be dyed by hand, sticks should be provided that are very smooth—glass sticks or enameled metal sticks are the thing. The purpose is to prevent breakage of the thread because of rough handling. Wringing is to be avoided, after dyeing, because of the hazard to the fiber. The fiber may, however, be rinsed, the excess of dye liquor being got rid of in this way. Then the centrifugal may be employed to eliminate the surplus water. The action of this machine is probably injurious only in a slight or moderate degree, if at all. The water is forced out by an even pressure.

After the silk has dried, a slight stretching is applied, in order to develop the gloss.

The scroop of natural silk may also be imparted with greater or less success by putting the artificial fiber through a treatment in a weak bath of acetic or tartaric acid. The fiber is dried without rinsing.

The basic dyes—at least, some of them—may be applied after a mordanting operation with tannin and tartar emetic. The operation here is similar to that used when cotton is the fiber. By mordanting thus, one may obtain on the artificial silk a heavier or a faster shade. In general, this procedure may be carried out thus: The artificial silk is first steeped in a mordanting bath containing tannic acid in amount equal to 2 to 5 per cent of the weight of the fiber. In this same bath there should also be 1 per cent of hydrochloric acid. The period of impregnation may be made several hours and the temperature maintained at 104 to 120 deg. Fahr. After this the silk is put through the centrifugal and then the tannic acid is fixed on the fiber in a new bath containing from 1 to 2 per cent of tartar emetic, the percentage being based on the weight of the fiber.

This fixing with tartar emetic is carried out in a cold bath and lasts, say, thirty minutes. The dyeing is then carried out with the addition of 2 to 3 per cent of acetic acid, and with the temperature at 85 to 100 deg. Fahr.

A secondary use of the basic dyes is to be found in their suitability for topping. That is, when the artificial silk has been dyed with a direct cotton color some of the brilliance of the basic dye may be imparted by using a basic dye in a new and cold bath containing a small amount of acetic acid. The direct cotton dye thus becomes a kind of mordant for the basic dye.

Even the sulphur colors may be used in dyeing artificial silk. In preparing the dye bath the same weight of sodium sulphide is used as of sulphur dyestuff. Glauber's salt is employed in an amount varying from 5 to 25 per cent and soda ash from 1 to 4 per cent. The dyeing is continued for one hour, and the temperature is maintained at about 100 or 120 deg. Fahr. Sulphur colors are understood to be capable of producing brown shades that are very fast against light.

Chrysophenine is a direct cotton dye which may be regarded as suited to artificial silk. When dyed on ordinary silk in an acid bath it produces shades very fast to light and washing. When using this dye on artificial silk, a 10 per cent amount of Glauber's salt and a 5 per cent addition of soap may be used in the bath. A 5 per cent addition of sodium phosphate is also to be put into the bath.

Certain dyes—particularly Eosine, Erythrosine and Rose Bengale—may be successfully applied to artificial silk by the use of a short bath maintained at blood heat. Two pounds—perhaps something over—of common salt are to be put into the bath for every 10 gallons of the liquor. The silk is simply to be whizzed and dried. No rinsing is necessary. Eosine comes into the market in the shape of small red crystals with a bluish reflex or else as a dark red amorphous powder. This dyestuff may readily be dissolved, but three times its weight of water being required. The shade produced, when it is used as a dye, is apt to be yellower than quite a number of other Eosines and Rhodamines. Erythrosine dyes a shade that is a very bright bluish red; it resembles primrose, in fact. Rose Bengale is a dark red powder which when used as a dye produces a shade of red that tends toward blue.

Methyl Blue is a dyestuff applicable to artificial silk. The dyeing may be advantageously carried out at blood heat in a bath containing 10 per cent of alum. Water Blue is another dye which may be applied in the same manner.

When artificial silk has been dyed with a sulphur color, the work is to be soaped in a lukewarm bath and then rinsed. Next, a souring in a weak acetic bath is given.

Artificial silk may also be dyed with certain direct cotton colors and then be put through the diazotization and developing process. Diazo Black is an example of the dyes that may be used in this manner.

The dyeing is carried out along the usual lines. Then the dye, now on the fiber, is diazotized in a bath containing sodium nitrite and hydrochloric acid. Finally, the diazotized dye is developed with some such developer as beta-naphthol or phenylene-diamine. When the entire procedure has been completed, the artificial silk may be treated with an emulsion of blue, oil and acetic acid. The effects to anticipate here are an increased luster and an improved feel. It is understood that a good deep black may be imparted to artificial silk by the foregoing process with Diazo Black.

When dyeing with any variety of artificial silk, speed is to be considered as of the essence of the procedure. Professor Pellew says: "Indeed, it is poor economy to be sparing of the coloring matter when working with any kind of artificial silk. For speed is essential, and the dyer who lets his material remain long in the dye bath is liable to get into difficulties."

The finishing of the dyeing operations with artificial silk may be carried out much after the manner customary with the real article. Thus, the work may be rinsed and then passed through a bath containing some olive oil, emulsified in a weak bath of soda ash. This increases the luster. It should also be dried at a fairly low temperature and, while drying, kept stretched out by hanging a wooden or glass rod in the loop of the hanging skein, or some similar device, taking care to avoid strain great enough to pull apart the weakened fiber. When dyeing great care should also be taken in tying up the individual skeins and in handling them. Turn them in this dye bath as little as possible consistent with even dyeing. The threads, unless very tightly spun, are constantly liable to come untwisted, and the knots to untie, causing much annoyance.

Where only small amounts of artificial silk are to be handled, the work may be run through a wringer for the purpose of ridding it of surplus water. The silk may be wrapped in clear blotting paper or cheap fiber paper, or soft and dry cheesecloth or muslin. The work wrapped up in some such absorbent material is run backward and forward between the rolls. This method seems especially adapted to work of all kinds that is weak and fragile.

Owing to the fragile nature of artificial silk, the direct cotton dyestuffs are used whenever possible, because their application involves the minimum amount of handling, whereas it has been seen above that the basic dyestuffs involve the maximum amount of handling. However, their use is compulsory when very brilliant shades are required.—"Silk."

Increasing Finishing Plant Production

Co-operation of Foremen—Noon Hour Shutdown—Results of Bonus System—The "Flying Squadron," an Innovation—Service Department

By R. A. S. REOCH

OUR first step in the direction of increased production, together with decreased costs, was to interest our foremen in what we proposed to do and show them the possibilities. We installed yardage clocks on the most important productive machinery, so that reliable data could be obtained. A free use of "Servis" recorders gave accurate information as to the actual running of machines, and this not only enabled the foremen, as well as myself, to keep in closer touch with the output from their rooms, but the psychological effect on the operatives soon produced a marvelous improvement.

Informing the Overseers

A daily report is received from the several departments giving the yardage run on the various machines. This report is transferred to a monthly report, from which we figure the average product per hour for each machine. It is only by having known facts before us that we are able to make correct deductions.

The next step was to give each overseer accurate data as to the number of employees, total hours worked, overtime hours, total production, and cost per yard. A chart is made up to illustrate these facts, and all of the above data is sent out weekly in folder form to each overseer in the plant. We also make up a monthly report showing total cost per yard, with itemized costs per yard for labor, supplies, drugs, repairs, fuel, general administration, and overhead, together with a chart illustrating the various cost figures.

The bringing of all this data to the attention of the foremen might in itself produce little or no results, but we take the precaution carefully to go over the various items with them each month, and show the necessity of keeping a constant watch over the factors that caused the curve on the chart to show an inclination in the right direction.

A large chart showing the general cost per yard for finished goods at the print works is shown at our regular overseers' meetings, or, if necessary, at special meetings, and a discussion is held in regard to the situation as it may present itself at the time. Emphasis is brought to bear upon the various points that need special attention.

Be Sure the Data Are Used

We feel strongly that any system to be of value must be followed up. To gather together important data and then file it away, or send it out to your overseers without comment, would be a mistake. If you are looking for results, it is of the greatest importance to keep in close touch with the use that is being made of all this data that is so carefully compiled.

A prime factor in this question of increased output per work hour is found in the necessity of cutting down all avoidable overtime. In a plant as large as our own, where all overtime is paid at the rate of time and one-half, the incentive is great on the part of the help to so arrange matters that the job cannot be finished without overtime. In a number of our departments there is a certain amount of overtime that cannot be avoided; as, for example, our color shop, where colors have to be prepared beforehand, so as to enable our printing machines to start promptly, and then again requires to be taken care of after the printing machine shop. Such overtime we might call legitimate, but much of the overtime in other rooms can and has been eliminated.

Full Noon Hour Shutdown

An important move in this direction has been the introduction of a plan whereby many departments now stop during the full noon hour without pay, in place of the old system under which the machinery shut down twenty minutes for lunch, which often extended for an extra fifteen minutes, all of which was under pay. This usually resulted in overtime to make up loss of product. When we run during the noon hour the regular day is up at 4 p. m. Now that we stop during the noon hour, the day's work ends at 5 p. m., and we receive a full return for the hour that was formerly badly broken up. When you learn that five rooms have made this change, you will realize what a saving has been obtained.

For the purpose of making an actual comparison so that the increase of product can be set plainly before you, we have taken an eight weeks' period before our campaign began, and compared it with a similar period during the months of September and October, 1921, many of our changes having been introduced at that time, and in successful operation.

Estimated Savings

An average increase in production was obtained amounting to 16½ per cent. The average number of hours worked per week since the change was made amounts to 90,702; whereas, under the former basis of running, 105,708 hours per week would have been consumed, making a saving of 15,005 hours per week. Should we multiply this saving by fifty weeks, at 40 cents per hour, a yearly saving of $300,000 would result.

It should be taken into consideration, however, that such an economy is only possible on the basis of the plant running at full normal product. A decrease in available orders would reduce the savings, while on the other hand an increase would make still greater savings possible. The lowering of our costs, made possible by the reduction of overtime work, which we found amounted to about 4,000 hours per week, if figured at the rate of 20 cents per hour, which is the half-time extra that is allowed for overtime, in fifty weeks would amount to $40,000.

This may seem to be a rather large claim, but to us it shows the value of a more extensive study of the problem, as we do not pride ourselves as having, by any means, reached even a minor degree of perfection.

Mechanical Aids

By the introduction of various mechanical devices a considerable reduction of employees has resulted. Foxwell guides have been extensively used in various departments to replace men guiding cloth into machines. Up to date sixty Foxwells have been installed, which has enabled us to reduce our normal force by thirty-six men.

All our trucking was formerly carried on either by hand trucks or by single electric trucks, and a very large force of men was constantly employed on these jobs, because of the long distances between objective points. We are now using tractor engines with long lines of trailers. On one floor we were able to cut our force eleven men, while on another level we reduced our trucking by seven men; this saving of eighteen men having been accomplished by the use of two tractors. A study of our transportation problem is now in progress, which we feel assured will show a further reduction of at least two men.

We have been able to increase largely our output of tentered work by the replacement of eight old tenter machines by new and up-to-date tenters that are supplied with proper drying facilities. On many of these machines the speed of operation has been increased from under sixty yards to over ninety yards per minute. The total product of this department shows an increase of 20 per cent, while at the same time our force of help has been reduced from 158 to 142.

To give still another instance of great saving, we would mention our white finishing department, which could almost be considered a complete unit unto itself. Here we have made a productive expansion of 54½ per cent, accomplishing it by the addition of 31 per cent in total hours. While making this remarkable showing, the quota of employees was only increased from 110 to 131, being an average of 19 per cent.

Results of Bonus System

Piecework has been the practice followed for some time in several of our departments, and the results obtained were, generally speaking, quite satisfactory. It was determined, however, to try out a bonus system in two rooms, to try to bring about an increase in our out-

put. The results obtained have been most encouraging.

In our gray sewing room, where pieces are sewn into continuous lengths by the use of power sewing machines, each girl turned out about sixteen sets of cloth per day and received 20½ cents per set. After the bonus plan got well under way these same girls increased their output to twenty-five sets, which means 66½ per cent increase. The weekly wages per girl advanced from $17.04 to $19.85, while the cost per set to the company was lowered from 20½ cents to 16½ cents.

In our card department, where girls are employed pasting patches of cloth on cards, piecework rates were not producing a satisfactory output, and it was felt that some incentive should be given to bring about better results. Out of fifty or more girls only a very few were able to make piecework. A bonus system was started, and now practically every girl in the room is making a bonus.

The old average per girl per day was 1,563 patches, and it has now, under the bonus plan, reached 1,991, which equals 21½ per cent increase. The girls' wages at the same time have increased 11 per cent. We feel very sure that the amount of work ultimately turned out will soon show a still higher figure, as the character of work has been decidedly difficult since the new plan went into operation, and it is fair to assume that with a more average line of cards to be made, a considerable increase in output will be obtained.

The field that we have to work on here is almost unlimited in its scope, but as the problem is a particularly serious and vital one, extreme caution must be used in its development.

A careful survey of our clerical force throughout the mill and the cutting out of duplication of reports have enabled us to eliminate nine clerks.

Use for Conveyers

In many of our rooms we have been able, because of local conditions, to handle a job by the use of two men where three were formerly required. By paying a few cents extra one man in many instances has assumed and successfully carried out the work which during the war required two employees. A careful study of the job has enabled us to cut our total force by at least 200 men, and at the same time largely to increase our product.

We have just installed a conveyer system to carry cases from our white finishing room to our shipping room floor below, and the economy of running it will undoubtedly enable us to pay for its cost in one year.

The "Flying Squadron"

A further plan has been drawn up, and figures have been obtained for the introduction of carrier systems that will relieve elevators, and enable us to handle rolls of cloth with much greater facility, and with a very great reduction in cost.

I would like to bring to your attention an innovation in our working forces that has proved its value over and over again. We started what we call a "flying squadron," made up of ambitious young men who were picked from various departments throughout our plant. They are distributed in the different rooms, and work a month or two before being sent to another deparement, thus becoming familiar with all the jobs in the print works.

If we should be short handed at any time, in any room, we can readily supply experienced men, and thus prevent any hold up in the work. We try to keep about twelve men on this squadron, and whenever a section hand or an assistant overseer is required, he is always drawn from this source. Many of these young men find themselves while working in some room, and the foreman is eager to retain their services. Such a chance could never present itself in the old days; in fact, few superintendents have been given this opportunity to go through all the departments and actually work in them.

A class in chemistry has been formed, which is attended by all of the flying squadron, and which is held wholly in their own time.

Help from Service Department

The position we take is that the results are well worth the time and effort expended. A definite plan is absolutely necessary in carrying out problems of this magnitude, and we feel that the greatest good can be accomplished by getting our men working together guided by a definite prearranged policy. One thing that we find must be constantly kept up is continual check on all productive performances, upon the help quota, upon supplies used, and on labor-saving equipment, as there will always be a tendency to backslide.

It is only fair to state that the better attitude of our help has played no small part in enabling us to put over many of the changes that have been introduced. The good feeling that has been plainly manifested can unquestionably be traced to a considerable extent to the fine efforts of our service department, whose work among the employees, while oftentimes hard actually to measure, still has its part in promoting good-will and friendly relations.—"Builders."

Fair Silk Mills, Inc., 103 Chestnut Street, Paterson, N. J., has been incorporated to buy, sell, manufacture, work, prepare, treat and in all ways handle and deal in raw, thrown and manufactured silk, wool and other yarn and textile fabrics. Capital is $50,000. Incorporators are Samuel Perlstein and Kathryn Larkin, both of Paterson; Louis Wishbow, of 922 Whitlock Street, Borough of the Bronx, New York, and A. Lawrie Young, of Totowa Borough.

At Nitro, W. Va., the Pickering Chemical Corporation has been incorporated by Oscar W. Pickering, John W. Hartman, Harry E. Martin and Leslie L. Cook. The capital consists of 7,000 shares of no par value.

Scouring Worsted Goods

How the Quality of Piece Goods Is Assured by Proper Scouring

THE brightness of colors and the handle of the fabric of a woolen or worsted fabric—in other words, the value of the goods—depend largely on the final scouring of the pieces, the object of which is to remove all dirt, oil and foreign substances without injuring the fibers by subjecting them to a process so severe as to give the cloth a dry, papery feel. The scouring of worsteds was discussed recently before the Bradford Textile Society by John Schofield, who classified the different methods under four heads:

1. A mechanical scour, such as was obtained with fuller's earth after indigo and wood dyeings, in which the action was largely but not entirely frictional.

2. Solvent scouring in which a medium like benzine or petrol is employed.

3. Emulsification scouring in which the oil, grease and dirt are detached from the surface of the fabric by forming a frothy lather, a medium which possessed very low surface tension and very high wetting-out power, and which carries away the dirt in the liquor in the form of very minute globules. This is the usual scour for worsted fabrics, and the same kind is employed in washing wool.

4. Saponification scouring, which is the typical woolen scour, in which the fabrics are oiled heavily with about 10 per cent of an oil, usually carrying a high proportion of free fatty acid. In this way, by the use of an alkali like sdoa ash the free fatty acids are converted into soap and the scouring of the pieces is effected. It is primarily a process of the saponification of the free fatty acids of the oil. It is a thoroughly efficient scour and has the unique property among scouring methods that it can be justified scientifically at every point. For this reason Mr. Schofield said it seemed desirable to take it as the standard form of scouring.

Results of Saponification

In the saponification scour the free fatty acid combines with the alkali to produce a soap. If oleic acid is present and sodium carbonate added, the result is soda oleate—a soap—carbonic acid gas, and water. There is here an effect which does not occur in other methods of scouring. At each point where free fatty acid is present the alkali generates a little carbonic acid gas, which tends to loosen the oil and dirt, and generates soap. Everything tends to break up the oil film on the cloth. It is the ideal scour.

The practical method of scouring in this way is to use alkali at 5 or 6 deg. Tw., at about 90 or 100 deg. Fahr., running on about 12 to 18 gallons for each piece. The action begins at once; if it is a warm day the action is so powerful that the lather rises to the sprinkler pipe. In about ten minutes the liquor runs off and more alkali is added to deal with the oil which has penetrated the fiber. This operation takes about twenty minutes or half an hour. The two-stage method is much better than the single stage, because one is not working with dirty liquor but with a clean scour with great diffusive powers. After this comes the washing-off process.

Carbonic Acid Gas

If carbonate of soda is replaced with ammonia no carbonic acid gas is formed. The use of ammonia is a reaction from the use of soda of excessive strengths, and if moderately strong sodas are used results can be obtained equal to those with ammonia. Sodas are being used from 8 to 10 deg. and even up to 20 deg. Tw., which is wrong practice, because they are apt to cause color bleeding and inferior handle.

It is desirable to know whether the saponification scour can be adapted to worsted goods. On worsted goods the oiling is very much less, say 2½ per cent, and the goods are more neutral in type than on woolen goods. With a neutral oil one cannot use the saponification process, and the oil can be removed only by the emulsification process. The practice is to employ weak alkali, about 4 deg., and some soap in a one-stage process. Why is it that the worsted trade always aims at neutrality in its spinning oils, while the woolen trade takes care of a large amount of acidity? Why does not worsted oiling allow the use of moderate amounts of free fatty acids? It is said that olive oil was the nearest natural approximation to the ordinary wool fat or grease, but as a matter of fact it is not so. It is also said that free fatty acids were sticky.

During the war, however, a very remarkable discovery was made. It was found that if small percentages, less than 2 per cent, of free fatty acid were added to ordinary mineral oil lubricants their lubricating powers are much increased; in fact, that coefficient of friction drops one-half. If that obtains in engineering practice, why should it not obtain in worsted spinning? As a scourer I want to see some free fatty acids in the oils so that I can effect scouring by the saponifi-

cation process. Undoubtedly more free fatty acids are present in the oils used in the worsted trade than most people imagine. I have scoured worsted goods on the lines suggested, using alkali as low as 1½ deg. Tw., and afterward a soap scour. Such scourings were invariably very successful and mills in Huddersfield have adopted the methods for their worsted goods.

With low-grade goods the scourer is up against it. There is everything to be said for a two-stage scour and the use of moderately strong alkalis; the use of a solvent is an advantage.

The idea is that the solvent dissolves the grease, but that is a fallacy. Imagine 300 pounds of pieces containing 10 per cent of oil; there would be 30 pounds of oil to remove. A pint of solvent is the most that is recommended, but what would that do with a couple of basketfuls of oil to remove? Solvents do not act as solvents in the scouring process, but as reducers of surface tension, and for that reason they are useful. But a solvent should be tested from that point of view and not from the point of view of capacity to dissolve grease. The emulsification scour ought to be the general scouring method for textiles.

In the discussion that followed, the chairman said he thought the question of mineral oil ought to be gone into, because during the last twelve months there had been disputes between Bradford merchants and manufacturers and Huddersfield dyers and finishers. Pieces had come up shady, and the dyers had had the pieces tested for oil and found some mineral oil in them. The case had been followed up to the wool combers, who said they never used such oil, and the spinners said the same.

Oil Spoils Dyeing

Mr. Schofield said there had been thousands of unlevel dyeings in Huddersfield which were said to be mainly due to oiliness. It raised the question whether the traditions of the trade with regard to oil were accurate. It had always been said, for instance, that a Scotch shale oil was better than the American oils. I believe that is wrong, Mr. Schofield said, though investigations had not gone far enough to enable one to state finally. The British Wool Research Board is investigating this subject. The action of light on oils is another difficulty. Organic oils seem to bleach under the action of light, mineral oils to stain. The staining is due to the mineral side of the oil entirely, and not, as is generally supposed, to the formation of resinous bodies. The whole subject has been revolutionized during and since the war by the power of hydrogenating oils, which put a tremendous instrument into the hands of the oil makers. Investigation is therefore required to find out the effects of oils.

D. McClellan said that as a dyer he could say they had used volatile solvents and had reduced the soap bill and got better results. Exposure of oils generally results in a kind of varnish which gives rise to fleckiness and listed pieces.

F. Longthorne said it was natural for spinners to use oils which would help the spinning process. When they buy a top spinners should see that it does not smell and that it is not excessively oiled, because if it is they cannot make a good yarn. Spinners added a little lubricant during the process in order to protect the material. That had to be done very judiciously. If too much oil is added the wool spins badly and the oil becomes sticky. He used a pure olive oil with a guarantee, and he had found from experience that that had given very good results. He did not think spinners were so much reticent about their oils as ignorant. Some of them did not mind so long as they were getting weight in.

Mr. Schofield said he was not afraid of a mineral oil, but he certainly was afraid of a drying oil. A great many stains called loom stains, due to mineral oil from working parts , are quite easy to remove in the scouring process. On high-class woolens containing 10 per cent of oil one-fifth of the oil is mineral oil. Why should there be such a worry about a very much smaller quantity in worsted goods? A drying oil, however, is different, because if it is on the outside of a cop of yarn it suffers from exposure.

Oil and Wool Fillers

W. Farrar Vickers said the difficulty was that there was no coherent technology of research with regard to oil in its application to the wood fiber. Scotch oil had been found not to have sufficient viscosity and body to give proper lubrication to the yarn. A mineral oil is non-oxidizable, and is very little affected by light. I knew, he said, of experiments conducted which have proved that fatty oil exposed to light and heat had oxidized and formed compounds between the oil and the wool, giving a stain which could not be removed. Repeated scourings simply deepened and fastened the stain. The staining caused through scouring and oxidation was due to fatty matters, and not to mineral oil. With regard to fatty acids, it is essential to have a certain amount in to start the scour. A perfectly neutral oil—say, an olive oil—is sluggish in starting. But we are not solely concerned with the scouring out of the oil. The oil is put on the wool for the purpose of lubrication and to preserve the fibers in the process of spinning and weaving. He asked the lecturer if he had made any experiments as to the corrosive effect of high percentage free fatty acid on the wool fiber. Mr. Schofield said he had not. He had been told that that was one of the objections to free fatty acids in spinning oils, but why was no such trouble experienced in the woolen side? A. M. Chapman said a worsted fabric was wholly different in structure from a woolen fabric. A worsted fabric showed the fibers more definitely, and something might pass in a woolen which would not pass in a worsted. He had had trouble recently with regard to some dyed indigo.

which had dyed properly except for a few threads in the piece, perhaps four or six at a place, forming a stripe clean through the goods, which spoiled the goods entirely. It had been found not to be due to anything in the make of the cloth. He did not know whether it was drying oil or some corrosive which had clung to the fiber, and it was a very difficult question to settle.—"Textiles."

Notes on Some Effects Produced Through the Printing of Basic Colors

By Raffaele Sansone

QUITE a series of articles are at present produced through printing color pastes containing basic coloring matters on cotton fabrics of all natures, consistence and finish, and they find a ready sale everywhere owing to the brightness of the patterns they contain, and owing to their suitability for many purposes. These colors are often printed for producing two classes of effects, and they are the very bright effects and the fast effects.

The Very Bright Effects

Such effects are most advantageous when highly sized goods are treated that have to lose as little as possible of their filling and where the effects to be produced are mostly of superficial character and seldom are made to pass through the body of the cloth or deep into this. In such cases the fabric is often printed with a coloring paste made up as follows:

One hundred parts of egg albumen are mixed into 100 parts of water heated to 30 deg. Cent., and the mixture is allowed to lie for twenty-four hours, during which all albumen floating on the surface of the solution is pushed down, causing it to enter into solution. The solution thus obtained is then passed through a fine sieve. During the above operations, for avoiding loss of time, 69 parts of wheat starch are mixed in the cold with 432 parts of cold water, and the mixture is continually agitated, while warming to the boil, until a uniform paste has been formed. When this has been accomplished, 60 parts of a 6½ per cent tragacanth mucilage are added while the paste is cooling down, together with 48 parts of acetic acid at 6 deg. Tw. When the paste thus produced has cooled down to the temperature of the chamber in which it is prepared, it is mixed uniformly with the albumen solution mentioned above, as soon as this has been sieved, and to the mixture obtained a solution containing 5 parts of the basic coloring matter, or of the mixture of basic coloring matters made to form the required shade, dissolving in 195 parts of water that has also been sieved for eliminating any grit it may contain, and which could enter later into the incisions of the printing rollers, causing trouble.

The color paste thus obtained is printed at once, or with a very short delay, as it can easily undergo deterioration, especially during warm weather. In those cases, however, where it is prepared for being employed after a few days, or within a few days, a small quantity of arseniate of soda is added during the preparation of the albumen solution, this being usually sufficient for avoiding, or at least retarding, its decomposition.

After printing, the cotton cloth is steamed for one-half hour at 100 deg. Cent., and dried at as high a temperature as possible. Through a similar method of proceeding prints are obtained that can resist a weak soaping, especially if this is carried out with neutral soaps such as are employed for wool and for silk. Very bright effects indeed can be obtained through the above process, and these are among the finest produced through the employment of basic coloring matters.

The Fast Effects

When faster effects are required, the cotton fabric is often printed with a color paste composed as follows: Seventy-two parts of wheat starch are mixed in the cold with 384 parts of water, and mixture is heated with constant stirring until a uniform paste has been produced. To this 108 parts of a 6 per cent tragacanth mucilage and 48 parts of an 8 deg. Be. acetic solution is next added. When a uniform paste has again been formed through boiling as little as possible, 20 parts of the basic coloring matter, or of the basic coloring matters if a mixture is employed, are dissolved in 178 parts of water containing 78 parts of acetic acid and 30 parts of glycerine, and the resulting solution is added, the stirring operations being continued till a homogeneous mass results. At this point, and as the paste is cooling down, 100 parts of tannic acid solution, prepared with 50 parts of this substance and 50 parts of water and acetic acid, is added, and when the same has been properly incorporated the paste is employed as soon as possible for the printing operations.

These are accomplished in the usual manner, and the fabric is then dried, steamed for two hours and again dried. After drying, the goods are either given

a plain, dull finish or are given a high gloss or shine that is sometimes increased through shreinering; owing, however, to the presence of the high percentage of size this can never be very great.

The Indulines

The above recipe can be employed for the majority of basic coloring matters, requiring in some special cases a greater percentage of tannic acid and of acetic acid than that indicated. When sparingly soluble basic coloring matters, such as the indulines, are, however, to be printed the following recipe is more to be recommended:

One hundred parts of wheat starch and 44 parts of wheat flour are mixed in the cold with 300 parts of water, and the mixture obtained is warmed until a uniform, half-transparent paste results. At this point 120 parts of acetic acid at 8 deg. Be. are introduced, being followed by 20 parts of the basic coloring matter, or basic coloring matters, required for producing the desired shade, and that have been brought in solution in 100 parts of water and 80 parts of acetic acid at 8 deg. Be. When the above additions have been properly incorporated in the paste, another 100 parts of acetic acid at 8 deg. Be. are added, together with 100 parts of a tannic acid solution made up half and half with this substance and a mixture of water and acetic acid, the paste being then brought in all to 1,000 parts.

The above color paste is printed on the material with the usual precautions, and this is afterwards dried in the hot flue, or on a chain drying machine of convenient construction, being then steamed for about two hours and again dried.—"Canadian Textile Journal."

Defects Developed During Wool Cloth Finishing

Crimps, Streakiness and Unevenness of Color—Sources of Streakiness—Evils of Conditioning Yarn—Defects Induced or Retarded in Crabbing—Developments of Defects in Yarn—Necessity of Suitable Training—Essential Factors—Examples

By PROF. EBER MIDGLEY

A Paper Read Before the Bradford Branch of the Foremen Dyers' Guild.

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DEFECTS in woven fabrics entail a serious loss to spinners, manufacturers, and dyers and finishers, as they involve allowances to the purchasers of the fabric. They also are a source of annoyance to all concerned. Claims are the chief cause of friction between those engaged in the various sections of the industry.

It is in the interests of all concerned to eliminate or at least reduce the number of defects in woven fabrics. If a piece has few defects, and these are strung, the merchant receives an allowance which reduces the profit of the vendor. If the piece contains numerous defects it is usually jobbed; that is, sold at an extremely low price. Reduction of defects in fabrics is therefore indirectly a means of increasing profits, and should receive careful consideration. Claims just and unjust are continually being made, and disputes arising out of them because the causes of defects are not thoroughly understood.

The prevalence of "defects in fabrics" has apparently increased during the last twenty years. Evidence of this is provided in the great increase in the number of burlers and menders employed to-day. Prior to the slump large quantities of goods were held up on account of there being an insufficient number of burlers and menders available, thus creating dead capital and in consequence a loss. Imperfections created in the early stages of manufacture reduced output during weaving, in addition to creating dissatisfaction on the part of the weaver.

The various agencies for reporting upon and dealing with defects in fabrics have had considerably more cases within the last twelvemonth than in any similar period within recollection.

During the period of the war goods were passed which in normal times would have been rejected and become job lots.

Defective fabrics are disagreeable realities and as such must be faced in the light that prevention is better than cure. As a matter of fact, many types of defects can rarely be remedied, but an effort should be made to avoid them. Many would be obviated if only there were more information available as to their creation.

In dealing with defects there is a tendency to at once ask, "Whose fault is it?" and if possible to make the guilty party pay, and then have done with it. Investigation of defects to their source is necessary in all instances if they are to be diminished and the standard of perfection raised.

Future Competition

Another factor is that during the war, and since, other countries have developed enormously their skill in cloth manufacture from all types of materials. Up to the present British textiles have had entree into practically all countries of the world on account of their high standard of excellence. Apart from any other factor, the fact has got to be faced that our standard is being approached in other countries.

To meet the new conditions and maintain our position it appears that we must strive for a higher standard of excellence in our products. Every process of manufacture should be brought into question, and every defect investigated to its source with a view to enhancing the quality and quantity of textile productions.

In respect to defects in woven fabrics, the Department of Textile Industries, Technical College, Bradford, has conducted over 1,350 investigations for the industry. These results are completely recorded and thus provide most valuable information on the subject.

Crimps, Streakiness and Unevenness of Color

Defects developed during the dyeing and finishing of woven fabrics are the most difficult to account for and to trace to their source. To place the responsibility is a difficult matter. The most serious irregularities and the most difficult to account for are those known as crimps and streakiness, which appear as unevenness of color. These defects are developed during the dyeing and finishing processes. In these stages of manufacture these defects are produced by reason of the wet processes developing the shrinking properties inherent in fabrics. Uneven shrinkage or movement of the fiber being the cause of the defects indicates that it arises from an absence of uniformity in either materials or treatment in any process, from fiber to finished cloth; hence every section of the industry can be involved in their creation. They are liable to be produced in all classes of wool fabrics during the dyeing and finishing processes, but more particularly in piece-dyed, clear-finished worsted cloths. They appear in various forms, but chiefly as indefinable dark and light stripes, situated intermittently in the direction of warp or weft, or both. They vary in size and appear to vary in shade of color.

On account of the conditions of weaving, the defect chiefly appears in the direction of the weft. When the defect is across the piece the intermittently situated dark stripe often commences at one edge and about the center of the cloth will die out and appear at the opposite edge as a light stripe. A peculiar feature is in many instances, when viewed from an opposite angle to the source of light, the stripes counterchange—i. e., light stripes appear dark, and vice versa.

The reason for this apparent variation in shade, which is an optical illusion, is not far to seek. In the case of a clear-finished worsted the surface possesses great reflective properties on account of:—

(*a*) The fiber constituting warp and weft yarns being situated in a fairly straight parallel position.

(*b*) The warp and weft yarns being situated an equal distance apart.

(*c*) The surface of the fabric being flat and level and free from extraneous fibers.

Any local variation in any of the above features will create a corresponding disturbance of the uniform reflective properties of the texture, and in consequence the light is either deflected or partly absorbed and will result in the part affected appearing darker in shade. (This feature is illustrated in the case of rubbing the pile of a silk hat in the wrong direction.) Hence any cloth produced from yarn which permits varying fiber movement, creating different fiber situations, will subsequently result in a cloth of varying reflective properties.

Sources of Streakiness

To indicate a number of the various sources of crimps, streakiness and apparent unevenness of color developed during the dyeing and finishing processes, extracts from the reports on a number of investigations are given below:—

Example 1.—Unsuitable Combination of Materials.—

(*a*) *Worsted suiting* (white warp and black weft).

Defect.—Crimpiness and general unevenness in shade.

Examination of Piece.—Uneven in shade, dark blotches appearing irregularly all over both side of the cloth, caused by a predominance of black weft fibers. Dark crimply line running more or less in a longitudinal direction.

Microscopic Examination of Black Weft Yarn.—Indicates:—

(1) A blend of fine and coarse material.

(2) Tufts of coarse fibers which have looped themselves at irregular intervals.

(3) Where blotchiness is present it is found that several of the above tufts or loops come together on adjacent picks.

Loom Particulars.—

Warp.	*Weft.*
2/20s.	2/20s.

35 threads per 1 inch.

Loom width = 71 inches.

Finished width = 58½ inches.

Conclusion.—The defect is due to the unsuitability of the blend of the weft material, together with the extent of shrinkage from loom to finished cloth. The fine and short fibers and coarse and long fibers constituting the blend provide the weft yarn with varying shrinkage properties. The severe treatment in wet finishing processes to reduce the width of the cloth 13 inches causes the above factor to be very evident. During the stages of shrinkage the short and finer fibers are acted upon more

quickly and to a greater extent than the coarse fibers, which in addition to being longer possess much less shrinking property. As the fine fibers are reduced in length the coarser fibers become slack and loop themselves on the surface of the yarn. Where a number of these loops come together on adjacent picks a dark blotchy place is created on one or another side of the cloth.

In blending together during drawing, materials of different diameter and length, difficulty is experienced in thoroughly mixing the fibers, the two materials tending to group themselves and keep apart. Further, during both drawing and spinning there is a variation in fiber control. It is evident that the longer fibers will be more controlled than the shorter ones, which creates a factor not conducive to thorough mixing.

(*b*) *Plush Fabrics* (warp pile).

Defect.—Streaky in color (warp way).

Examination of Cloth.—Shows the cloth to be very streaky and to appear to vary in shade of color. The streakiness is very irregular throughout the piece.

Microscopic Examination of Tufts of Pile.—

NOTE.—The pile material is produced from a blended material of 75 per cent English Lincoln and 25 per cent mohair.

(1) *Light Shade of Pile.*—The material composing the pile yarn in the lighter sections of the cloth indicates a blend of two materials, one much coarser than the other. The coarse material is to be recognized as wool and the fine material as mohair. The bulk of the blend is of the coarser fiber in the proportion of three to one.

(2) *Dark Shade of Pile.*—The same materials but a much smaller proportion of the finer (mohair) material. The number of fibers in a tuft from a dark portion are considerably fewer than in a tuft taken from a light portion, the diameter of the yarn being in the same ratio. Different tufts which have been produced from the same warp tread in some places appear light and in others dark, the dark places in each instance being composed of tufts containing fewer fibers.

Conclusions.—The streakiness of color developed during piece dyeing is due to the unevenness of the warp pile yarn employed. In the lighter portions the pile is most dense and in consequence reflects most light. In the dark portions the pile is least dense and allows light to be absorbed, and on this account appears dark in shade. The source of the defect is the insufficient mixing of the two materials employed.

EXAMPLE 2.—DEFECTIVE YARN.

Navy Blue Dress Fabric.

Defect.—Warp and weft streakiness.

Examination of Piece:—

(1) *With light on surface.*—Shows the cloth to be streaky in both warp and weft directions throughout.

(2) *With light through.*—Shows the cloth to be uneven in density, thick and thin places occurring irregularly in both warp and weft directions.

Examination of warp and weft yarn.—Very irregular in diameter, thick and thin places occurring at irregular intervals along the same length of yarn. When examined under a microscope the thick places contain two or three times as many fibers as the thin places.

Warp Yarn (two fold).		*Tests for twist.*
Average turns per 1 inch (normal)	=	17.95 = 100%
Turns per inch (thick places)	=	12.76 = 71%
Turns per inch (thin places)	=	23.79 = 132%
Weft Yarn (single).		*Tests for twist.*
Average turns per 1 inch (normal)	=	10.32 = 100%
Turns per inch (thick places)	=	7.64 = 77%
Turns per inch (thin places)	=	13.64 = 132%

Conclusion.—The foregoing results indicate that the defect is due to the abnormal irregularity in diameter and twist of warp and weft yarn.

EVILS OF CONDITIONING YARN

The artificial conditioning of yarns on bobbins, so extensively practised at the present time, is responsible for a great deal of streakiness in color and barriness in dyed and finished fabrics. As a result of artificial conditioning the outer layers of yarn on the spool receive all the solution applied, with the result that a physical and in some instances a chemical alteration takes place in the parts of the yarn affected. The amount of alteration varies according to the type of oil or emulsion, or both, applied to the material to facilitate manufacture, and also the agent employed in preparing the conditioning solution.

The wool fiber, under the influence of moisture, shrinks and curls up. When they so curl up, the fibers become shorter in length, and in consequence cause portions of the yarn to contract. The yarn below the surface of the spool is held tightly by the outer layers, hence the conditioning solution is unable to penetrate equally all portions of the material. Also the presence of one layer of yarn upon another prevents the fibers from altering their position.

The wool fiber being a plastic substance, the pressure imposed by one layer of yarn upon another will have a tendency to fix or set the fibers to their position. Hence, in particularly heavily conditioned yarn, the fibers constituting the outer layers of yarn, in spool or bobbin form, are differently situated to the fibers which constitute the inner layers of yarn.

These conditions are considerably accentuated in the event of any chemical alteration. Most of the agents employed in preparing conditioning solutions contain a soluble oil. This type of oil possesses great hydroscopic property and in consequence assists the absorption and retention of moisture. Soluble oils are readily acted upon by heat, as in the case of the cloth being subjected to crabbing. Although these oils are readily soluble in water, the alteration created during crabbing has caused it to be fast against scouring. In such an instance it will

be observed that there is both a mechanical and chemical variation on each spool of material.

Among other obvious advantages to the manufacturer and dyers and finisher, this particular type of streakiness would be almost if not entirely eliminated if unconditioned yarn only were employed.

EXAMPLE 3.—ARTIFICIAL CONDITIONED WEFT YARN.

Navy Blue Suiting.

Defect.—Indefinable stripiness, weft way, coming in and going out and changing in size.

Test:—

(*a*) The defect was reproduced by employing weft yarn of same material and structure of spool as employed in manufacturing the cloth. (Loom width 70 inches, and length of pick on the bobbin 130 inches.)

(*b*) The defect was not perceivable when the same weft material, with length of pick on bobbin 86 inches, was woven with the same loom, width 70 inches.

Conclusion.—With the length of pick on bobbin of 130 inches, the affected portions are situated so as to create the defect, whereas with length of pick on bobbin of 86 inches the irregularity of the same becomes so distributed as to avoid the production of stripiness.

EXAMPLE 4.—USE OF UNSUITABLE OILS.

Recently a type of shadiness has been developed in piece dyed goods hitherto unknown and due to the use of unsuitable oils in yarn manufacture. The unsuitable oils are substitutes for olive oil. Some of these readily generate acids and oxides; others, when the cloth is subjected to heat and moisture, as in the crabbing process, maintain their percentage composition but develop a difference in their physical characteristics. The products obtained from the former (oxidation) and the latter (polymerization) are not readily removed by ordinary scouring methods. Since these changes do not take place uniformly, there is a danger of uneven treatment during dyeing and finishing.

Before employing a substitute for olive oil it should be made certain that the chemical and physical constants of the substitute oil are equal to those of olive oil. In testing the oil for these properties, simple chemical and physical examinations are not sufficient. It is necessary to determine the tendency to oxidation and polymerization by an extended examination of the oil beyond the usual chemical examination.

Investigations of the properties of various oils have been undertaken, and in this respect the action of light on mineral oil has yielded interesting results.

EXAMPLE 5.—MIXING UNWOUND AND WOUND WARP YARN.

Dyed Worsted.

Defect.—Dark stripes running parallel in warp direction.

Conclusion.—It is ascertained that the warp contains some threads of wound material. During the process of spinning the draft and twist take place in one direction. Hence in the process of warping, weaving, and dyeing and finishing there is a tendency in one instance (unwound material) to lay the fibers straight, and in the other (wound material) to rub up the fibers, thus producing a shady appearance in stripe form.

EXAMPLE 6.—MIXING OF WARP YARNS OF DIFFERENT QUALITY.

Plush Fabric.

Defect.—Dark stripe in warp direction.

Conclusion.—Microscopic examinations of tufts in perfect and defective sections:—

	Fibers.	*No. of Fibers.*
Perfect section	Uniform diameter	41
Defective section	Thin and thick in diameter	32

EXAMPLE 7.—DEFECTIVE YARN AND MIXING OF RUNS.

Nigger Brown Costume Cloth.

Defects:—

(*a*) Dark stripes, warp way.

(*b*) General warp and weft streakiness.

Examination of Piece:—

(*a*) Contains stripes about 1 inch broad, running warp way throughout the cloth and across the full width of the piece, and appearing darker than the remainder of the cloth.

(*b*) Very uneven in shade and streaky in both warp and weft direction.

Examination of Yarns.—Warp stripe (quality of material).—Microscopical examination shows that the yarn in both the defective and perfect portions of the cloth is composed of a blend of a fine and coarse wool. The fine material is a lighter brown in shade than the coarser material, due to the different dye-taking properties of the two materials. There is more of the coarse material in the defective yarn.

Warp Streakiness:—

Thick places	11.75 turns per inch	= 81%
Thin places	20.59 turns per inch	= 142%

Weft Streakiness:—

Thick places	6.73 turns per inch	= 70%
Thin places	12.77 turns per inch	= 133%

Examination of Gray Warp Yarn.—(Two runs of yarn labeled 1 and 2 are mixed to form the warp.)

Counts and Twist.—No appreciable difference.

Quality of Material.—As indicated in examination of warp yarns from finished cloth. Run 2 contains a greater proportion of the coarse material.

Dye-Taking Qualities of the Two Runs of Yarn.—A hank of each was soap scoured and afterwards dyed, both being subjected to absolutely identical treatment. The result indicated a distinct difference in color.

Conclusions:—

(*a*) The dark stripes in the warp are due to employing two runs of material which differ in respect to proportion of materials blended.

(*b*) The warp and weft streakiness is due to the abnormal variation in diameter and twist of the warp and weft yarns which occurs at irregular intervals along the same length of yarn.

EXAMPLE 8. — DEFECTIVE YARN AND DEFECTIVE WEAVING AND MIXED WEFT YARN.

Navy Blue Botany Suiting.

Defects:—

(*a*) Shady weft way.
(*b*) Weft streakiness.
(*c*) Weft barriness.

Examination of Piece:—

(*a*) Shows the piece to be very badly shady weft way throughout, the changing of the bobbin of weft, during weaving, being distinctly marked, the cloth woven at the commencement of a bobbin appearing much lighter in shade than the end of the preceding bobbin, or the end of the same bobbin width. The change in shade is gradual from light to dark. The commencement of each bobbin of weft is also very distinctly marked by the irregularity which occurs in the selvedge of the cloth at these points.

(*b*) There ase also distinct streaky weft bars present at irregular intervals. These are of various widths and darker in shade than the body of the cloth. The width of the cloth is irregular and coincides with the variation in shade, the piece being wide where a dark place occurs.

(*c*) The piece is also very barry in bobbin widths, in addition to being streaky.

Conclusions:—

(*a*) *Weft Shadiness.*—Due to variation in the picks per inch at the beginning and eand of each bobbin (defective weaving).

Picks per inch at beginning of bobbin:—70, 68, 70, 70, 72, 72, 72, 68, 68, 70, 72, 68, 68, 70, 72, 72, 72, 72.

Picks per inch at end of bobbin:—74, 72, 74, 72, 76, 76, 78, 72, 80, 76, 76, 76, 74, 78, 80, 76, 78.

(*b*) *Weft Streakiness.*—Due to abnormal variation in diameter and turns per inch in the same length of yarn. The twist varying between 9.68 and 20.58 turns per inch in the case of the yarn producing the bars, and 8.03 to 21.5 turns per inch in the yarn producing the body of the cloth (defective yarn).

(*c*) *Weft Barriness.*—Due to the abnormal variation in counts between the yarn in the bars, 1/40s, and the yarn in the body of the cloth, 1/30s (mixing of yarn).

DEFECTS INDUCED OR RETARDED IN CRABBING

An essential process in the finishing of worsted goods composed of yarns possessing shrinking properties is crabbing.

A woven fabric produced from such yarn, as it leaves the loom, is more or less a mass of unbalanced strains, and unless these become balanced and assume a state of equilibrium there will be a great tendency for the fibers and yarns to shrink irregularly and give the fabric a streaky or cockled and unsalable appearance.

Under the influence of moisture at a high temperature the wool fiber swells and becomes plastic and, like other horny substances when under this influence, readily takes a position forced upon it. This position, if maintained until the cloth becomes cool, is permanent, subject to the material not being placed under subsequent influence of moisture. The cloth when prepared for crabbing is in roll form, and the necessary degree of application of smooth surface and pressure is provided by one layer of cloth being situated upon another, which becomes intensified as the process is continued. As the correct degree of pressure is an essential factor, the amount of tension applied to the cloth during winding and rewinding is important.

The process of crabbing calls for the application of much judgment and experience on the part of the operator.

It is correct to state that crabbing makes or mars the fabric. The degree of treatment varies according to (*a*) quality of material; (*b*) structure of yarn; (*c*) weave and structure of fabric. As these factors vary considerably in woven fabrics, it will readily be realized that each type of cloth must be considered separately and treated accordingly.

Irregular treatment and excessive or insufficient tension during the crabbing process may be responsible for the cloth becoming unmarketable. Such defects as watered, streaky and crimpy effects are very often due to indiscriminate crabbing.

DEGREE OF TREATMENT ACCORDING TO QUALITY OF MATERIAL

In high qualities of worsted the process of crabbing is often omitted. This is justifiable, as they are produced from good qualities of Botany yarns. The higher the quality of the material and the more uniform the length and diameter of the fiber, and in consequence more uniform shrinkage. The lower the quality of the material and the more variation in the length and diameter of the fiber and a corresponding lack of uniformity in the shrinkage of the texture. Worsted materials are given quality numbers which originally represented the spinning property of the material, but in addition their shrinking properties and also variation in shrinking properties are indicated. Hence it will be recognized that the crabbing of a crossbred serge made from, say, 36s. quality must be of a different character to that of a cloth produced from a material of 60s. quality. Also the lower the quality the more severe the treatment.

Another factor which influences the degree of treatment is the type and twine of yarn.

Developments of Defects in Yarn

As the twine of yarn influences the shrinkage of a cloth, so any variation in the twine of the yarn will create similar conditions to a variation in length and fineness of the fibers. Cloths composed of unevenly twisted yarn (normal variation) may be so treated during crabbing as to greatly diminish the risk of irregular shrinkage and the production of a defective crimpy fabric. Alternatively, fabrics composed of the same type of yarn will develop a streakiness if insufficiently treated during crabbing. A typical example of the latter is provided in the following case:—

Example 9.—Defective Crabbing.

A batch of twenty-five gray pieces of crossbred serge (12 ounces per yard) produced from one run of yarn and identical in all other respects were split into two lots for the purpose of dyeing and finishing. Lot one of ten pieces was forwarded to firm A and lot two of fifteen pieces to firm B. When returned, dyed and finished, those from firm A were passed and considered reasonably perfect, while those dealt with by firm B were so defective that they were rejected and considered unsalable. An investigation of the defective goods revealed the following:—

Examination of Pieces.—(*Light on surface.*) Shows the piece to appear uneven in shade throughout its length and across its entire width. The unevenness consists of narrow dark places running irregularly, coming in and going out at short distances, and running in a longitudinal direction.

(*Light through cloth.*) Uneven in density and it is found that the dense places coincide with the dark places mentioned above.

Examination of Warp Yarn.—The warp yarn is found to be irregular in diameter, thick and thin places occurring at irregular intervals along the same thread.

Test for turns per inch of Warp Yarn:—

Average of 40 tests each, thick places 7.8 turns.

Average of 40 tests each, thin places 11 turns.

It was found in the cloth that the thick and thin places on one thread often coincided with the thick and thin places on preceding and succeeding threads.

Microscopical Examination.—Showed that thick places in the yarn contain twice as many fibers as the thin places.

Conclusions:—

Yarn.—The quality of the material is sufficient to spin a uniform yarn of this count. After making an allowance for fiber movement during dyeing and finishing processes, the yarn cannot be considered abnormal in variation. When this contracted material is drawn straight to approximately loom conditions, the unevenness of fiber situation is appreciably reduced.

Weaving.—The uniform state of the warp in the cloth and the uniformity of the picks indicate a well-woven fabric.

Dyeing and Finishing.—As ten pieces of the above material have been satisfactorily dyed and finished by firm A, it is evident that there has been some difference in treatment by firm B.

In the case of insufficient setting or fixing during crabbing, the irregularities in the yarn would permit uneven movement of fibers in subsequent wet finishing processes. Alternatively, if fixing or setting be more complete the fibers have not the opportunity to irregularly develop in subsequent processes, and in consequence the unevenness cannot develop to the same extent as in the former instance.

The defect is primarily due to slightly uneven warp yarn. This irregularity is induced or retarded by treatment during dyeing and finishing. The treatment in one instance (firm A) has retarded this influence and in the other instance (firm B) it has been induced.

Note.—An inquiry at the works of firm B revealed that these goods, 12 ounces per yard, had been treated during crabbing in an identical manner to goods 16 to 18 ounces per yard. As suitable pressure of one layer of cloth on another is essential to obtain the required result, it is evident that suitable conditions in respect to pressure for a 16 to 18 ounces per yard cloth will be insufficient for a thinner 12 ounces per yard cloth. In consequence the treatment of the latter was not suitable to perform the desired fixing or setting of the fibers in the cloth.

Necessity of Suitable Training

In the textile industry of to-day it is necessary to know one thing thoroughly and become a specialist in one branch of the industry.

The worsted industry has divided itself up into sections, and great advantages have come to the trade in consequence, but a disadvantage to which this tendency has given rise is that each section has concentrated too much upon its own concerns and has not paid sufficient attention to the allied sections.

Examples have been given where a lack of co-ordination between different branches of the industry—especially manufacturers and finishers—has resulted in defects being created which could have been avoided, and also the finished product not being the best obtainable from the material employed.

Continental Success

The success of certain Continental-made fabrics is due to the fact that spinner, manufacturer, dyer and finisher work in unison. Raw material is chosen and manufactured, dyed and finished with one definite aim in view, with the result that the best is made of the material and the best products from the materials employed are placed on the market.

If we desire to become more efficient we must study our own particular branch most carefully and add to that a general knowledge of the preceding and succeeding processes. At the same time we must not allow our

general views and studies to take away from our excellence in some particular branch.

Essential Factors

In producing a woven texture there are four essential factors:—

1. Type and quality of the raw material.
2. Structure of the yarn.
3. Build and design of the fabric.
4. Finishing processes and degree of treatment in each.

The specialist in any one of the above factors is more efficient and more capable of meeting new conditions when he has a knowledge of the remaining factors.

The cloth manufacturer must be a specialist in cloth structure, and the more knowledge he possesses of qualities of textile materials, yarn manufacture and the influence of dyeing and finishing processes, the more he can make of the materials he is handling and also a greater variety of fabrics he is able to produce. Likewise the more knowledge the dyer and finisher has of the processes of cloth manufacture, and of the properties of the cloths he is handling, the more he can enhance their quality and also treat the material in such a manner as to retard the development of any irregularities they may contain.

Such knowledge can only be obtained through the medium of a suitable course of technical training which, if scientifically conducted, develops an appreciation on the part of the student which results in an increased interest in the work and also in increased working capacity.

The Chemical Question

An Open Letter to Warren G. Harding, President of the United States

By FRANCIS P. GARVAN

President of the Chemical Foundation, Inc.

July 14, 1922.

Hon. Warren G. Harding,
President of the United States,
Washington, D. C.

Dear Mr. President:

The Chemical Foundation has forwarded to the Alien Property Custodian its formal answer to his demand, its answer as an American corporation ready at all times to defend its rights in our courts. But the American public, in whose interests this corporation was organized, is entitled to be fully informed as to the circumstances under which this demand was made and the reason why it is unqualifiedly refused.

The Alien Property Custodian stated no authority or reason for his demand for the entire property and assets of this corporation, for an accounting of all its past business and for the entire cessation of its activities, except that he was acting by your express direction. I am therefore compelled to imply that he was acting under the letter given out by you and the statement of the Attorney General accompanying it.

These two papers demonstrate that you, Mr. President, have been grossly misled by the Attorney General, both as to the law and the facts of this case, as the following will show:

1. The Attorney General has made no investigation of the Chemical Foundation or the facts surrounding its formation. Listening to German agents, German commissions, or former German lawyers exclusively is not an investigation.

2. The United States Government has no interest in the suits brought by the Chemical Foundation in reference to the Federal Trade Commission's licenses. That dispute is between the Foundation and the former German owners. If they both failed to prove their claim, the money in the United States Treasury must be paid back to the Americans who used the patents and paid in the money. The United States Treasury is only the stakeholder.

3. At the time that Woodrow Wilson, President of the United States, delegated his power of sale to Frank L. Polk, acting Secretary of State, who authorized the Alien Property Custodian to sell the patents to the Chemical Foundation, neither the President, the Secretary of State, nor the Alien Property Custodian was under the law in the remotest sense a trustee for the German enemies, nor were they such at the time the patents were taken over by the Custodian.

4. Specific power to sell patents was granted by Congress, after full committee hearings, on November 4, 1918, and on March 28, 1919, Congress settled whatever ambiguity there might have been in the law before that time in the following language:

"The Alien Property Custodian, . . . in addition thereto, acting under the supervision and direction of the President, and under such rules and regulations as the President shall prescribe, shall have power to manage such property and do any act or things in respect thereof or make any disposition thereof or of any part thereof, by sale or otherwise, and exercise any rights or powers

which may be or become appurtenant thereto or to the ownership thereof in like manner as though he were the absolute owner thereof; . . ."

5. The President was thus vested with power to supervise all sales made by the Alien Property Custodian, and by the same amendatory act was given power to waive the requirement for public sale where the public interest demanded it. By virtue of the power of delegation given him under Section 5-A of the Trading with the Enemy Act, the President by Executive order, dated December 3, 1918, delegated these powers to Mr. Frank L. Polk, who was the then acting Secretary of State.

Frank L. Polk thereafter issued certain orders by virtue of this power and authority, authorizing the Custodian to make the sales of patents, copyrights and trademarks to the Chemical Foundation, Inc.

The first of these orders was issued on February 26, 1919. This order recites that by virtue of the authority of the President vested in him by the provisions of the Act and the amendments made to Sections 12 and 7 (c) thereof on March 28, 1918, and November 4, 1918, respectively, which authority has been delegated to him (Frank L. Polk) by Executive order of December 3, 1918 (above mentioned), he thereby in the public interest determined and ordered:

"That the Custodian might sell at private sale, without public or other advertisement, to the Foundation at such place and upon such terms and conditions as to the Custodian, or his authorized agent, might seem proper, all of the letters patent and trade-marks and rights thereunder, including all damages at law and in equity for the past infringement thereof, which the Custodian had seized or might seize under the Act, and which he (the Custodian) should from time to time determine to relate to the objects and purposes of the Foundation as expressed and defined by its charter."

The order then recites the reasons in the public interest for the foregoing determinations:

1. That the letters patent, trade-marks and similar rights could not be sold to the best advantage at public sale after public or other advertisement.

2. That the Foundation had been incorporated for the purpose of holding letters patent, trade-marks and similar rights relating to the chemical and allied sciences as trustees for American industry, for the purpose of the Americanization of such industries as may be affected thereby, of eliminating alien interests hostile to said American industries and of the advancement of chemical and allied industries in the United States. That the Foundation was obligated to grant non-exclusive licenses upon equal terms at a uniform royalty to qualified American manufacturers and is empowered to grant free licenses to the United States for any use the United States might desire to make of the inventions covered by the letters patent and similar rights.

3. That the public interest would be best served by a wide use of the inventions covered by the letters patent and similar rights and that such wide use could be most readily promoted by the licenses which the Foundation by its charter was obligated to grant.

4. That a private sale would prevent the said letters patent, trade-marks and similar rights from falling into the hands of purchasers who would be unwilling or unable to put the inventions covered thereby into use or would use them for purely speculative purposes.

5. That it would be impossible to make a public sale of the said letters patent, trade-marks and similar rights so as to secure the foregoing benefits to the public.

6. That unnecessary expense, delay and inconvenience may be avoided by private sale.

The Alien Property Custodian, pursuant to the order and to a supplemental one dated April 5, 1919, and under the authority vested in him by the Act, thereafter consummated the sale of divers letters patent, copyrights and trade-marks, together with all rights and benefits appurtenant to the ownership thereof, to the Foundation.

6. Following the return of the President from abroad, an Executive order was issued by him on February 13, 1920. In this order the President in the public interest determined and ordered; That the Custodian was authorized (a) to make such sale to the Foundation in the manner therein provided, and (b) in case of sales theretofore made of property which he was thereby authorized to sell, but as to which his prior authority under Mr. Polk's orders was deemed doubtful, to confirm and ratify the same by suitable instrument of confirmation.

The order is concluded by the following:

"My reasons for the foregoing determination and order are stated in the said orders of Frank L. Polk of the 26th of February, 1919, and the 5th of April, 1919; and in addition thereto, the public interest will be best served by the elimination of any enemy interest adverse to American citizens arising by reason of said choses in action, or rights, interests and benefits under agreements and by the devoting of any payments made by reason of said choses in action or under said agreements by the Chemical Foundation, Inc., to the promotion of the objects stated in its charter."

And in pursuance of this order, the Alien Property Custodian confirmed and ratified to the Foundation, by instrument dated March 1, 1921, all sales theretofore made to it by him.

This confirmatory order was purely cautionary and later proved superfluous in the light of the decision of the United States Supreme Court in Central Union Trust Company vs. Garvan (254 U. S. 554), and Stoehr vs. Garvan (255 U. S. 239), which squarely upheld the President's powers of delegation under the Trading with the Enemy Act.

This sale was made in the full light of all branches of the Government and in the full light of publicity. The

idea of its formation was the result of the intimate knowledge of the past use of these patents in a manner hostile to the United States' interests, and in full consultation with all the executives of the Government, the experts of our Army and Navy, and leaders of our chemical business organizations and the heads of all our scientific and research organizations. I do not ask you to accept my present statement of the matter, but insert here an extract from the report of A. Mitchell Palmer, filed with the President February 22, 1919, and by him forwarded to the Congress, and by that Congress made a public document and most widely commented on by the press throughout the entire country:

"The amendment of November 4 to the Trading with the Enemy Act presented for the first time an opportunity for what appears to me to be the most important piece of constructive work which has been possible in my department. Until the enactment of this amendment it had not been possible to take over German patents. These patents, as had been already indicated, formed a colossal obstacle to the development of the American dyestuff industry. Evidently they had not been taken out with any intention of manufacturing in this country or from any fear of American manufacture, which the Germans apparently thought could not be successfully carried on under conditions prevailing in this country in regard to costs and to the supply of technicians and skilled labor. Upon consideration, however, it seemed that these patents offered a possible solution for the problem, hitherto unsolvable, of protecting the new American dye industry against German competition after the war. If they were not taken out in order to prevent American competition they must have been obtained as a weapon against competing imports. If they were sufficient to stop importation of competing Swiss, French and English dyes, they would presumably serve, in American hands, to stop the importation of German dyes. This was particularly probable in the case of the product patents, since most of the coal-tar dyestuffs are definite chemical combinations to which a product patent is entirely applicable.

"The idea was accordingly conceived that if the German chemical patents could be placed in the hands of any American institution strong enough to protect them, a real obstacle might be opposed to German importation after the war, and at the same time the American industry might be freed from the prohibition enforced by the patents against the manufacture of the most valuable dyestuffs. Accordingly, these considerations were laid before various associations of chemical manufacturers, notably the Dye Institute and the American Manufacturing Chemists' Association. The suggestion was met with an instantaneous and enthusiastic approval, and as a result a corporation has been organized to be known as the Chemical Foundation (Inc.), in which practically every important manufacturer will be a stockholder, the purpose of which is to acquire by purchase these German patents and to hold them as a trustee for American industry, 'for the Americanization of such institutions as may be affected thereby, for the exclusion or elimination of alien interests hostile or detrimental to the said industries and for the advancement of chemical and allied science and industry in the United States.' The voting stock is to be placed in a voting trust of which the trustees are to be the five gentlemen who for months have been acting as the sales committee which passes upon sales made by my department, that is to say, George L. Ingraham (former presiding justice of the appellate division, first department, New York Supreme Court); Otto T. Bannard (president, New York Trust Company); Cleveland H. Dodge; Benjamin H. Griswold (senior partner of Brown Bros., bankers, Philadelphia); Ralph Stone (president, Detroit Trust Company), and the charter is so framed that under the patents nonexclusive licenses only can be granted on equal terms to all proper applicants, and must be granted to the United States free of cost. The company is capitalized at $500,000, of which $400,000 is to be 6 per cent cumulative preferred stock and $100,000 common stock also limited to 6 per cent dividends. The first president of the Chemical Foundation (Inc.), will be Francis P. Garvan, of the New York bar, to whose clear vision and indefatigable industry I am chiefly indebted in the working out of this plan. By Executive order obtained under the provisions of this act, I have sold to this company for the sum of $250,000 approximately 4,500 patents, the remaining $250,000 has been provided for working capital so that the company may be able to commence immediately and prosecute with the utmost vigor infringement proceedings whenever the first German attempt shall hereafter be made to import into this country. The charter of the corporation provides that surplus income is to be used for the retirement of the preferred stock and thereafter for the advancement of chemical and allied science and industry. The price thus paid was necessarily determined somewhat arbitrarily; the great majority of the patents were presumably valueless. The value of the remainder was entirely problematical and impossible to estimate. Substantially the entire industry having combined for the purpose of this purchase, it would have been impossible on public sale to find as a bidder any legitimate manufacturer. No other bidder could, therefore, have been found on public sale except some speculative individual who might have bought them for purposes practically amounting to commercial blackmail. The combination was not objectionable to public policy since it was so organized that any genuine American, whether a stockholder of the company or not, could secure the benefits of the patents on fair and equal terms.

"It is submitted that the organization of this institution constitutes the most important step that has been taken for the protection of the new industry."

Note that at the time this was written I was a dollar-a-year man, with no expectation of becoming Alien Property Custodian, and at a time when I thought my own war services were over and I was about to return to New York to resume my law practice. At that time, as

the Government was in such full sympathy with the Chemical Foundation organization, it was not felt that my services as president thereof would necessarily be more than advisory. It was only on March 4, when Attorney General Gregory resigned and Mr. Palmer was made Attorney General, that I was asked to accept the position of Alien Property Custodian and remain in Washington.

Some three months after this publication I was a witness before the House Ways and Means Committee on behalf of an organic protective measure, and the Foundation and its organization was thoroughly inquired into. At that time I stated to the Committee:

"The foundation of the Chemical Foundation was an effort to form an organization to represent as nearly as possible at that time the public interests. Judge Ingraham, of New York, and Judge Gray, of Delaware, had charge of drawing our charter and our trust agreement, and our certificate of incorporation. We have endeavored to make it as nearly a public institution as our laws allow, and at the same time have it an official organization. We wanted to sell these patents to the Government, and if there had been any method by which we could make them a working force, and still have them owned and controlled by the Government, it would have relieved us from a great deal of responsibility, and if there is at this time, any suggestion for modification or amendment of our plan which will insure in the minds of the committee a more definite and certain fulfillment of the intention and purpose of our organization, I am certain that the Chemical Foundation and all its stockholders and all who are interested in it, would be glad to conform to the wishes of the committee, because, in so far as we have the public recognition and public support, we become more efficient and become more able to carry out the intentions which are in our hearts and minds."

Thus it will be seen that this sale was made by the Chief Executive of the United States acting under proper authority from Congress, and consisted of property absolutely owned by the United States and disposed of by him after months of the most exhaustive consultation with every possible person cognizant of the lessons of the war and competent to advise, so that the final steps in that victory might be insured and accomplished.

It is the first time in the history of the United States Government that the Chief Executive has been advised by his Attorney General to attempt to abrogate the solemn Executive Order of his predecessor. It is the first time in the history of the United States that the Chief Executive has been advised by his Attorney General to violate a sacred contract entered into by the Government with its citizens.

You, Mr. President, apparently upon the report of the Attorney General, base your entire decision upon the assertion "that the sale was made at so nearly a nominal sum that there is reason to believe that the Government has not faithfully observed the trust which was implied in the seizure of this property." What better test of the actual value to the Foundation of the property sold to it than the result of its first three years' operation?

$271,850 was paid to the Government, and $157,050 working capital was provided by 150 Rmerican firms, on no dollar of which would any one of them receive more than 6 per cent, but who never have received anything, and whose entire investment you now demand be destroyed. The total or gross income has averaged $143,216.65 per year. The running expenses, exclusive of all educational activities, the bare overhead expenses, have averaged $121,971.35 per year, or a net excess of $21,245.30, which is 0.049 per cent on $428,900, gold dollars, actually invested. This allows nothing for depreciation. The average life of the patents is eight years, so that 12½ per cent of the $271,850 cash paid for the patents, or $33,981 per year, should be subtracted from the above apparent net receipts for each year, which leaves an actual annual operation deficit of $12,735.70.

But the Chemical Foundation has in addition spent $264,017.85, the entire balance of its capital, in educational work, which included the circulation of about 100,000 copies of that great work, Slosson's "Creative Chemistry," at a cost of about $100,000 of its capital, to schools, colleges, libraries, editors, Boy Scout Masters and others; and 750,000 copies of that great report on the relation of chemistry to medicine by John J. Abel (Professor of Pharmacology, Johns Hopkins Medical School, Baltimore, Md., Editor, "Journal Pharmacology and Experimental Therapeutics"); Carl L. Alsberg (Director, Food Research Institute, Stanford University, Cal., formerly Chief of the Bureau of Chemistry, Department of Agriculture, member Council of Pharmacy and Chemistry, American Medical Association); Raymond F. Bacon (Director, Mellon Institute for Industrial Research, Pittsburgh, Pa.); F. R. Eldred (Chemical Consultant, Eli Lilly & Co., Indianapolis, Ind.); Reid Hunt (Professor of Pharmacology, Harvard Medical School, Boston, Mass., formerly of U. S. Public Health Service, President, U. S. Pharmacopeia Convention); Treat B. Johnson (Professor of Organic Chemistry, Yale University, New Haven, Conn.); Julius Stieglitz (Chairman Department of Chemistry, University of Chicago Chicago, Ill., Past President American Chemical Society, Chairman, Subcommittee on Synthetic Drugs, National Research Council, Vice-Chairman, Council of Chemistry and Pharmacy, American Medical Association); F. O. Taylor (Chief Chemist, Parke, Davis & Co., Detroit, Mich.), and Charles H. Herty (Editor, "Journal of Industrial and Engineering Chemistry," New York City, Past President, American Chemical Society), to doctors, hospitals, medical schools, universities, libraries, etc. It has contributed $10,000 to the National Research Council; it has supported the production and standardization of proper biological stains, which are so necessary for the identification of pneumonia, tuberculosis, diphtheria, etc., and has financially aided the movement to guarantee for the future the publication in the English language of science's advances and any other good works it has done,

the details of which are on our books and before your auditors.

It has given its all. You can take away nothing but the opportunity of service. It was all we got from the Government. It is all we have. Traitors say I sold to myself. Your auditors are on our books. In American fairness I ask you to direct them to seek and seek, and then to certify to the American people whether I or anyone connected with the sale have ever received anything but abuse.

Much seems to be made of sums we may obtain from the Federal Trade Commission. Even if every contention of ours is sustained after years of litigation, the amount received will not restore our capital spent upon education.

Mr. President, you have had the temerity to impugn the honor of the gentlemen who boast a part in the great work of building up or preserving the possibility of progress in organic chemistry for America. You have again been misinformed as to the nature of the trust we bore. That trust was not for the German Cartel, the owner of practically all the important patents, who had received them under the unthinking graciousness of laws they had induced. That trust was for the American people, their industrial independence and the safety and health of their children and their children's children.

They say I am a fanatic on the subject of importance of organic chemistry. As if one could exaggerate the importance of the basic science of life! But let others, far removed from all the prejudices and passions of anyone among us, tell you of its importance.

First: In relation to our industrial prosperity: I quote from a recent open letter to Parliament by James Morton, chairman of Alexander Morton Sons & Co., the largest carpet manufacturers of England, and chairman of the Scottish Dyes, Limited, which his company was forced to build up when the war shut off supplies from the German world monopoly. His remarks, though applied to England, show on their face their equal application to the present situation:

"Whatever the explanation, the war has surely roused us sufficiently to significance of the new facts. No modern nation can any longer remain apathetic to the vast potentialities of Chemical Science. There is no mistaking the fact, and it should be written large everywhere in these times, that Organic Chemistry is the Key to the World of New Values. And it is our good fortune that it lies so peculiarly to our hand to cultivate. We have facilities superior to Germany if we care to co-operate and run our forces together. The textile trade is the great feeder for dyes. Dye-making is the natural starting place, and has been the nursery for all the great chemical developments, developments that have been cumulative in their effects and given enormously enhanced value to industries widely diverse. . . .

"Now, ladies and gentlemen, it was the discovery in 1914 of the reality of such facts, of the stupendous significance they had for the well-being of our country, that made our people and Government determined to be efficient and self-supporting in the field of Organic Chemistry. In those days we were dealing with hard realities and acted with instinctive soundness of judgment. Nothing was felt to be more vital not only to the cost of the war, but to our whole future as a commercial nation, than that we should equip ourselves and be second to none in scientific research and operations. It was a resolution of the Government and of the people of this coun try as deliberate, as vital and as binding as any taken in those strenuous days of war. Here was territory we must strengthen and hold at all costs, and no part of our war operations, not even the defense of the Channel Ports, was more important in the long run for this country. The battle was heroically taken up. It required fortitude and steadfastness equal to any operation of the war, for while it entailed much hidden and humble work and had none of the glamour that appeals to the popular mind, it demanded unlimited patience and doggedness, and those engaged knew they would have to rely on the good faith of the people long beyond the time and excitement of actual warfare.

"And what are we experiencing now? The making of dyes was the tangible object on which this big effort had to concentrate (for we cannot cultivate Chemical Science simply in the abstract) and the Dyestuffs bill was the line of support which the Government ultimately formed to enable the fight to continue till the territory would be won and thoroughly secured. What we are witnessing now is the attempt by our late enemy to influence some of the holders of our line to forsake their positions and work for the destruction of those valuable results that have been achieved by their own comrades through years of dogged fighting. For that is the literal translation of the present effort to repeal the Dyestuffs bill. The Germans know we are on the way to becoming efficient and absolutely self-supporting in the making of dyes. They are amazed at the progress we have been able to make in so short a time. They know that an efficient Chemical Industry established here would radiate wealth to every avenue of our commerce and give us a power we never had in the world before. They realize that of all their war losses not Alsace Lorraine, the African Colonies, nor any territorial possession can compare with surrendering or sharing such a slice of their special province of science, and it may be taken that they will move heaven and earth to arrest the growth of chemical science in this country.

* * * * * *

"But I must bring this desultory talk to an end. There are many other aspects one could discuss, but what I have said may help to give you something of the hang of this dyestuffs question. I have tried to show that it is at least something too complex to be measured by a simple difference in prices of commodities of commerce, and that it involves issues that transend the ordinary axioms of buying in the cheapest market. It is surely for statesmen to take the long, national view. Would we

allow any nation to build our ships exclusively for us though it offered to supply them free of charge for a generation? Would it be good policy in any Government to allow a craft so vital to our existence to drop out of the ken and capacity of our people?

"And to-day probably our most vital necessity as a nation is that we should repair our long neglect of the natural sciences, and of chemistry in particular. This is the new adventure calling for new qualities in our people. And here also we must build and sail our own ships looking only to our own compass for guidance. The material wealth of the modern world certainly lies in that direction, and what finer intellectual and even moral exercise can be found for our younger generations than grappling with the crude substances of the earth and converting them into things of new value and beauty. If we are to be in the van of the world's doings in the years to come it will only be by raising armies of young men trained first in the pure sciences and then applying that knowledge, with imagination and skill, to the varied resources that lie waiting, not only within our own country and empire, but at our very door.

"But do not let us think this can be done by talking science in the abstract or by patriotic rhetoric. It can only be done by providing a nucleus and substance round which these developments can grow. In the dye trade, raised up at such cost during the war, we have that natural nucleus and starting point. I want you to realize that there is, and will be, a determined attempt, amounting almost to conspiracy, to arrest development and destroy this splendid foundation. It is for you to think twice and thrice before taking any action that might jeopardize the growth of a thing so vital to the future of this country. Have in mind that other countries are now alive to these high functions. America in five years' time will have dye works and general chemical works equal to Germany, with all the added stimulus this means to the education of her people and the enhanced values that must radiate to every one of her industries.

"I know it is difficult to get statesmen sufficiently roused to the value of anything purely scientific, or to think justifies any Government care. Even Gladstone, scholar and statesman though he was, when Faraday was explaining one of his epoch-making discoveries, could only remark, 'But after all, Mr. Faraday, what use is it?' 'Why, sir,' replied Faraday, 'there is every probability that you will soon be able to tax it.' When fully developed the chemical industry will open many new sources of revenue for a hungry Treasury and here at least is something that would lighten the burden of industry and help to sweeten the lives of every one of us."

Second: Its importance to national defense: I simply call your attention to the French edition, issued within the month, of "The Riddle of the Rhine," by Victor Lefebure, and the two introductions thereto by Marshal Foch and Field Marshal Sir Henry Wilson, whose recent death shocked the world. I content myself with the simple quotation from the preface of Marshal Foch:

"In 1918 chemical warfare had undergone a considerable development in our armies. The establishments which Germany possessed prior to 1914 had permitted her to push rapidly the manufacture on a large scale of chemical products used on the front to develop greatly that struggle in a new form.

"The Allies by way of reply to this had been forced to make studies and to organize important factories. By that means only, and that tardily, they had put themselves in condition to respond to the ever increasing needs of their armies.

"And now the aeroplane, which is every day carrying heavier weights, is going to furnish a new means of delivering abundantly toxic gases by means of more and more powerful bombs, and of attacking armies and the centers of population situated behind them or of rendering tracts of country uninhabitable.

"Chemical warfare is thus in a condition to produce more territorial effects over ever wider spaces of territory.

"It is uncontestable that this extinction finds readily its realization in such a country as Germany, given over in times of peace to the manufacture on a large scale of chemical products, a simple modification in whose reactions can transform them into war material.

"This country, partially at least, deprived of her numerous effects of soldiers, carefully trained, regularly organized and powerfully armed, will be more inclined toward the new systems of attack offered by chemical warfare.

"Chemical warfare should therefore enter into our provisions and preparations for the future if we do not wish to undergo some former double surprises.

"The work of Major Lefebure gives an exact idea of the possibilities which are found to-day in Germany, and therefore of the dangers with which she threatens us. By this title he gives a warning and information of the highest order for those spirits who remain anxious for the fate of their country in view of the insufficiency of the ancient means of battle which the progress of industry renders less effective day by day.

"In sounding the alarm in each of our two countries, I find myself in the company of my faithful friend, Field Marshal Sir Henry Wilson. It is an old habit of ours, contracted in many years' association, that we should talk things over to-day in order to *assure once more peace for the future.*"

Third: Its importance as the only sound basis of the future development of medicine: I content myself with quoting from an article by Professor Julius Stieglitz, formerly president of the American Chemical Society and head professor of chemistry in the University of Chicago:

"Moreover, the domain of the science of the transformation of matter (organic chemistry) includes even life itself as its loftiest phase: from our birth to our return to dust the laws of chemistry are the controlling laws of

(*Concluded on page* 104.)

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

LOUIS A. OLNEY
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SOME ASPECTS OF "THE CHEMICAL QUESTION"

THAT the American chemical industry as a whole is lining up solidly behind Francis P. Garvan in his determination to test the legality of the Alien Property Custodian's demand for the return of the German patents held by the Chemical Foundation, is increasingly indicated as time passes. And that the head of this organization means to offer a spirited legal battle no one can doubt after a perusal of his open letter to President Harding, given elsewhere in this issue because of its complete summing up of the industry's attitude.

Up to within a short time before this issue went to press, that reply of Mr. Garvan's had constituted the latest major move in the controversy, but another event occurred so far-reaching in its significance that it here becomes necessary to review it.

Judge Augustus N. Hand has filed an opinion in the United States District Court in which he upholds the right of a German company, whose American property had been seized and sold by the Alien Property Custodian, to resume business in this country and solicit trade from its former customers.

The case was an action in equity brought by the Koppel Industrial Car Equipment Company against the Orenstein-Koppel A. G., of Berlin, formerly known as the Orenstein Arthur-Koppel Company, in an effort to prevent the German corporation from again doing business in this country. The Koppel Industrial Car & Equipment Company was the purchaser of the good-will and property of the German concern, including its plant at Koppel, Pa., near Pittsburgh. After the war the German corporation established an office at 50 Church Street in the name of L. E. Hellmann. Eric Joseph, named as a defendant in the suit, is now in charge of the New York office. Before the war he was in charge of the entire American business.

The Alien Property Custodian made a deed to the Koppel Industrial Car & Equipment Company of the property and good-will of the foreign corporation, and it is the contention of the American company that this transfer prevents the German company from now doing business in this country.

Judge Hand, in his opinion, said:

"I cannot discover any legal principle which leads to such a conclusion. If the German corporation had made a voluntary conveyance of its property and good-will to the complainant, the weight of authority holds there would follow an implied covenant on the part of the grantor to abstain from business here, including solicitation of former customers, and to do nothing in derogation of the grant. But the sale of the American good-will in vitum is quite a different matter and cannot terminate or affect the right of the German corporation to do business in the United States. It is like the case of the sale of a bankrupt's estate, which does not prevent him from resuming business with his old customers.

"It is not necessary to hold that the sale of the good-will of a corporation by a receiver under a decree of a court having jurisdiction of all of the assets will not pass title to the good-will of such corporation good as against the whole world. Such a proceeding is as inclusive as the property on which the jurisdiction of the court is based. But how can it reach the property of a foreign corporation over which the court has no jurisdiction, and how can a seizure by the Alien Property Custodian reach the right of a foreign corporation to do business in this country in its own name after the war power is exhausted? The real question is: 'What could the Alien Property Custodian convey?'

"The most the complainant can ask is that the German corporation shall not pretend to be doing business or manufacturing equipment at the Koppel plant or to be the complainant corporation. I cannot see that it has done so, excepting by the use of the catalogue, which contains a picture of the plant. The elimination of this catalogue seems to be necessary. The preliminary injunction must be limited to this elimination."

While it is true that this case does not involve patents, nevertheless it may have an important bearing on future decisions should the Germans succeed in recovering the patents which the Chemical Foundation now holds and which are being used by a number of American chemical manufacturers.

The reply of Mr. Garvan should be carefully read. It has been considered too strident in tone by a small portion of our daily press, one representative of which even affected to view it as "an affront to the President." But it is far from that, and a consideration of it should speedily convince anyone that American chemistry is joining with Mr. Garvan, not in a defiance of authority, nor in a flouting of the law, but in a legitimate struggle to test the relative merits of conflicting opinions as to what *is* the law.

The American Chemical Society, representing some 15,000 men and women working in educational insti-

tutions, research laboratories, and industrial plants, is preparing to fight to the last ditch to preserve the American chemical industry.

The attempted seizure of the Foundation's patents has made the necessity for such a fight apparent to this group. In the hope of placing a fair presentation of the views of American chemists before the President, Dr. Edgar F. Smith, former Provost of the University of Pennsylvania and now President of the American Chemical Society, appointed a committee to serve with him. Their purpose in seeking a conference with President Harding was to lay before him briefly the far-reaching effects which the contemplated action against the Chemical Foundation will have upon chemistry in America. The committee also desired to have any facts which could properly be given to them in order to guide the Society in its future actions. The committee with Dr. Smith as chairman is as follows:

Dr. J. E. Teeple, consulting chemist, New York, treasurer of the American Chemical Society.

Dr. R. H. McKee, head of the Department of Chemical Engineering, Columbia University.

Dr. J. F. Norris, professor of organic chemistry, Massachusetts Institute of Technology, Cambridge, Mass.

Dr. A. D. Little, consulting chemist, Cambridge, Mass., past president of the American Chemical Society and of the American Institute of Chemical Engineers.

E. R. Weidlein, director, Mellon Institute of Industrial Research, Pittsburgh, Pa.

Dr. George D. Rosengarten, director and member advisory committee on National Policy, American Chemical Society, Philadelphia, Pa.

Dr. Juilus Stieglitz, University of Chicago.

William Hoskins, consulting chemist, Chicago, Ill.

H. E. Howe, editor, "Journal of Industrial Engineering Chemistry," member National Research Council.

None of the members of this committee are dye manufacturers or connected with the Chemical Foundation. The committee believes that the President would not have taken this step if he had possessed full information or had called into conference unprejudiced persons well able to advise him.

American chemists believe in the Chemical Foundation and no facts have been presented thus far by the Administration to shake their faith in this institution, which has become the nucleus of the organic chemical industry in this country.

The request for a conference with the President was made on July 12, and was followed by two reminders. Not until July 21 was official word received from the White House. It was then stated that the President would be unable to meet such a committee for the present because of the other urgent and imperative matters now before him.

The American Chemical Society is about to hold its annual meeting in Pittsburgh, where the situation will be presented in detail to the governing body at the general meeting. The Society is planning a vigorous campaign to have the country understand the true situation. The latest evidence of the necessity for this action is an announcement carried in an Associated Press despatch from Chicago, dated July 18, which conveys the significant intelligence that the Third German-American National Conference adopted resolutions including the following:

"We greet with satisfaction the first steps of the Administration to correct the iniquities committed by the Custodian of Alien Enemy Property."

It is also significant that George Sylvester Viereck was chairman of the Resolutions Committee which framed that paragraph. Viereck, it will be remembered, attracted much attention during the war as a persistent German propagandist.

There is still another among the manifold aspects of the present situation which should not be overlooked by those who suppose that the dye industry is the only one with anything at stake. The future production of fixed nitrogen in America, which is of vital importance in making fertilizers, is likewise seriously menaced by the possibility of the restoration of the German patents. This was made clear recently in a statement issued by Mr. Howe in his capacity of editor of the "Journal of Industrial and Engineering Chemistry," and member of Dr. Smith's committee.

"The development of methods which appear to offer the best possibilities of producing cheap nitrogen fertilizer would be jeopardized by the restoration of the German monopoly," said Mr. Howe. "This directly affects the Muscle Shoals project. The larger plant at Muscle Shoals, as has been pointed out repeatedly, is a cyanamide plant. At the time this plant was built, the question of cost of production was of secondary importance.

"The smaller plant at Muscle Shoals, known as Plant No. 1, intended to use the synthetic ammonia process—a modification of the Haber process, developed and owned by Germans—was an experimental plant. Since, a commercial plant has been built and is in successful operation by one of the great American chemical companies. Progress in various parts of the world indicate clearly that the coming process of fixing nitrogen, at low cost, is the Haber process, or a modification of that process.

"The development of the Haber process in the United States for fertilizer and other useful forms of nitrates will be practically stopped in case the group of patents now held by the Chemical Foundation are returned to Germany. The concern mentioned above now producing ammonia by the Haber process is a licensee of the Chemical Foundation.

"Experts generally agree that unless the Haber process can be developed, there is not the remotest

chance of Henry Ford or anyone else being able to operate Muscle Shoals or any other plant for the fixation of nitrogen on an economic basis.

"The War Department and the Department of Agriculture have felt the development of the synthetic ammonia process of fixing nitrogen sufficiently important to spend several hundred thousands of dollars per year to carry on research work."

Mr. Howe referred to testimony before the Senate Committee on Agriculture and Forestry, concerning cost of fixing nitrogen by various processes, of Dr. Charles L. Parsons, secretary of the American Chemical Society and former chief chemist of the Bureau of Mines.

Statements from Dr. Parson's testimony follow:

Senator Norbeck—Suppose the Government furnished free power for the manufacture of fertilizer under the cyanamide process; would it reduce the cost of fertilizer $1 a ton or $10 a ton or $20 a ton?

Dr. Parsons—My opinion is that if you gave the power for nothing and paid a bonus on top of it of pretty nearly the price that you are counting on for your power there (at Muscle Shoals), say $10 per horsepower year, you cannot fix the nitrogen by the cyanamide process in competition with the Haber process without sensible power requirements.

Further on in his testimony Dr. Parsons referred to a cyanamide plant at Odda, Norway:

Dr. Parsons—They sold that plant on the 11th of last February, a plant which cost several million dollars, under bankruptcy proceedings for $10,000, or 50,000 kroner. . . . They simply could not continue the production in competition with the Haber process.

"The return of these patents to Germany would place America at the mercy of a foreign monopoly—a condition similar to that which existed before the war," was Mr. Howe's view.

In closing, The REPORTER wishes again to emphasize the fact that a menace confronts the American chemical industry which only united action can thwart, and that the reason it should be thwarted is not because it happens to favor Germany as distinct from any other nation, but because it is anti-American.

NEW WATER TREATMENT

A recent discovery has been made by a Brighton, England, scientist by means of which radio-active powers may be imparted to water. The possibilities of this as regards industry are not yet known, but at present the Brighton Corporation are using the radio-active water for removing incrustations from hot water pipes and the treatment is meeting with complete success.

23114

Recent Patents

Fabric-Measuring and Cost-Computing Machine

JOHN L. WHEELER, ST. LOUIS, AND EDWIN A. REED, MAPLEWOOD, MO. (ASSIGNORS TO THE MEASUREGRAPH COMPANY, ST. LOUIS)

(1,413,307. April 18, 1922.)

This relates to fabric measuring and cost computing machines. These machines usually embody in their construction, a measuring roller which is rotated as the fabric passes through the machine, and the rotation of the measuring roller is imparted to indicating mechanism that indicates the length or selling charge of the piece of goods measured. The driving mechanism, as heretofore constructed, includes a considerable train of gears and co-operating pinions to effect the necessary reduction of the movement for driving the indicating pointers or an indicating chart. After a measuring movement the indicating mechanism is returned to the zero position; in returning, the mechanism is prevented from racing by means of a centrifugal governor. The general object of the present invention is to simplify the driving mechanism so as to enable a number of the co-operating gear wheels to be eliminated, to the end that a very simple and compact mechanism is produced for driving the indicating mechanism; our object also is to provide a more effective location for the returning means that returns the indicating mechanism to zero and a more effective location for the centrifugal governor that prevents the racing of the indicating mechanism in returning to the zero position. An important object of the invention is to provide simple and efficient stop mechanism for stopping the indicating mechanism in the zero position in its returning movement and for stopping the same also at the limit of the measuring capacity of the machine.

Referring more particularly to the parts, the machine includes a casing which is removably placed over a frame which carries the mechanism of the instrument. Mounted in the frame is provided a measuring roller which is mounted so that it will be rotated as the fabric passes through the machine. The rotation of this roller is imparted to driving mechanism which actuates the indicating mechanism of the instrument. There is provided a stop-member which is mounted in such a way that when the indicating mechanism moves the stop-member moves progressively so that it travels along a path as the indicating mechanism moves. In this way the stop-member will operate to assume an extreme position at one end of its travel corresponding to the zero position at the other end of its travel corresponding to the limit of the measuring capacity of the machine; inventors pro-

vide automatic means for actuating the stop-member in one of its extreme positions so that it will engage a part of the indicating mechanism and stop the same at the zero position; also means for actuating the stop-member in its other extreme position to engage a part actuated by the measuring roller, and in this way inventors arrest the measuring roller and stop the indicating mechanism at the limit of the measuring capacity of the machine.

In the construction of machines of this character it is customary to provide a main frame plate which supports practically all the internal mechanism of the instrument. Heretofore the side of this plate has carried the co-operating pinions and gears which reduced the driving movement from the measuring roller to the indicating mechanism; according to the present invention inventors dispense with this gear train and provide a very large gear wheel which is disposed near the outer end of the frame and adjacent to the wall of the casing, and we provide means for driving this large gear wheel from the measuring roller. This large gear wheel and the pinion which drives it, effects an immediate and very great reduction in movement; it has been impossible to accomplish this large movement reduction by gearing attached adjacent to the main frame plate because, on account of other parts attached to the frame plate, it was impossible to use a large gear, such as described. In this way, by providing a long shaft on the measuring roller there is established a sufficient movement reduction at one step to enable the driving mechanism to drive the indicating mechanism.

The frame includes a substantially vertical main frame plate which rotatably supports one end of the measuring roller, the lower end of the frame plate being secured to a base plate which constitutes a part of the frame. The measuring roller carries a shaft which extends from it so that its end lies near the vertical end wall of the casing and at this point the shaft carriers a pinion which meshes with a large gear wheel rotatably mounted on the frame, that is to say, the large gear wheel is mounted to rotate in a vertical plane and disposed near the outer part of the frame and near the vertical end wall of the casing, the driving mechanism for operating the indicator being located in the space between the large gear wheel and the frame plate. The large gear wheel is secured to a sleeve which is rotatably mounted in a fixed vertical frame member and the inner end of the sleeve is formed into a head which constitutes a clutch member co-operating with another clutch member, the latter clutch member being rigidly attached to a bevel gear which is rigidly secured to a feed screw, the inner end of which is rotatably supported in the main frame plate. Within the sleeve there is provided an inner shaft or stem the inner end of which slides loosely into the outer side of the gear wheel; the sleeve extends through a bushing to which it is splined, and this bushing carries the hub of the large gear wheel. Between the gear wheel and the head a coil spring is provided; the outer end of the sleeve carries rigidly an enlarged head with a rabbet groove on the inner edge. In the normal position of the parts the spring holds the clutch closed and as this time the inner face of the head lies adjacent to the outer face of the frame member.

In using the machine the edge of the fabric to be measured is introduced into a gap which is formed between the measuring roller and a presser roller; the presser roller is then permitted to descend upon the measuring roller. The mechanism for this purpose forms no part of this invention. After the goods has been measured off, the edge of the fabric is notched or marked by means of a knife carried on a knife lever which is pivoted and normally held elevated by a spring. This knife lever may be actuated by means of a thumb plate which is accessible from the exterior of the machine. The presser roller is mounted on a suitable rocking frame with which co-operates a hand controlled latch which may latch the presser roller in its elevated position.

When the cloth is pulled past the measuring roller it rotates the measuring roller and the rotation is imparted through the roller shaft and pinion to the large gear wheel; the rotation of this gear wheel is imparted through the clutch to the bevel gears and thence through the shaft to the pointers on the dial. The rotation of the feed screw by the large gear wheel rotates the pinion which imparts its motion through idler to the shaft and this drives the take-up roller. The take-up roller pulls the chart off the supply roller and brings the figures on the chart past the scale.

If it is attempted to measure a greater length of goods than the capacity of the machine will permit, the machine will be automatically stopped at twelve yards, which is the limit of the measuring capacity.

After the desired quantity of cloth has been measured the operator of the machine actuates the knife lever to mark the edge of the fabric at the point where it is to be cut off, after which it opens the clutch.

Claims include: In a machine of the kind described, the combination of a frame, a measuring roller supported thereby and mounted so as to be rotated as the fabric passes through the machine, indicating mechanism, driving mechanism for actuating the indicating mechanism from the measuring roller, a stop-member, means for moving the stop-member progressively as the measuring movement progresses so that the stop-member travels as the indicating mechanism moves, and assumes an extreme position when the indicating mechanism is at its zero position, and automatic means for actuating the stop-member when in its extreme position, to stop the indicating mechanism in its zero position.

Cloth-Treating Machine

JOHN M. JOHNSON, CHICAGO, AND WILLIAM G. GOTTSCHALL, DECEASED, LATE OF CHICAGO, BY HENRIETTA H. GOTTSCHALL, ADMINISTRATRIX (ASSIGNORS TO HART SCHAFFNER & MARX, CHICAGO)

(1,410,256. March 21, 1922.)

This relates to cloth treating machines the purpose whereof is to take the cloth as it comes from the mill and prepare it for tailoring. It will be understood that cloth, especially woolen fabric, as it comes from the mill has a "mill finish" which leaves the fabric in a glossy condition and this finish should be dulled before the cloth is cut and fashioned into garments. Furthermore, the cloth as it comes from the mill is shrinkable and must be shrunk before it can be properly made into clothing. The purpose of this invention is to provide organized mechanism which will remove the mill finish and shrink the cloth in a continuous and uniform manner.

A "steamer" is provided which consists of a U-shaped receptacle with a screen stretched across the top, said screen being covered by a sheet of loosely woven fabric designed to distribute and diffuse the steam rising from the receptacle. Steam is supplied to the receptacle by a pipe which has a horizontal portion located within the receptacle and perforated at the top for the exit of steam. By preference, this horizontal portion of the pipe is surrounded by an outer sheet which is perforated at frequent intervals along the bottom, thus tending to distribute the steam within the receptacle.

The cloth is usually treated a bolt at a time, the bolt thus affording a long strip of cloth which may be passed continuously through the machine. This strip is usually carried upon a truck which in practice is rolled to the head end of the machine. From the truck the cloth passes around suitable guide rollers. In the present case a roller is provided at the top of a frame and a second roller is arranged at a lower part on the frame. On either side of the steamer are guide rollers. These are so placed as to receive the cloth from the roller and to guide the cloth horizontally over the top of the steamer in close proximity to it. The cloth is thus subjected to the action of the steam rising from the steamer.

Adjacent to the steamer is a water bath which consists chiefly of a tank. A guide roller is mounted near the bottom of the tank near the head end thereof, and the cloth passes from one roller under another and thence over the first of a pair of squeezers. These squeezers are preferably "semi-vulcanized" rubber, the material being soft enough, however, to be somewhat yielding. The cloth passes between these two squeezers and down to a guide roller near the bottom of the tank at the rear end thereof. At the rear end of the tank are two uprights which support wringer rolls. These are geared together so as to rotate in synchronism and one of them is driven by a pulley or other suitable power device.

From the wringer the cloth passes to an overhead guide and traction roller mounted on a shaft journaled in a framework. The cloth passes thence to two rollers of a plaiting or piling machine adapted to deposit the cloth in a pile on a truck or other suitable receiver. The roller is journaled at the free end of arms which are suspended from pivots carried by the arms of the rocking frame. The two rollers are constantly urged toward each other by tension springs.

The rocking frame is oscillated about the shaft by any suitable mechanism. In the present case there is a crank rigidly fastened to a shaft journaled in the frame. Said crank is connected to arms by connecting rods. The result is that as the crank rotates the frame is rocked back and forth and piles the cloth upon the truck.

The rollers are power driven and while the gearing may in many respects be varied, it has been contrived to drive them in synchronism by chain gearing.

The cloth is brought to the machine on a truck or other support and threaded through the machine by which the cloth is subjected to the action of the steamer. Thence the cloth passes under a roller which is submerged in the water tank. The cloth then proceeds to and passes between the squeeze rollers, after which it again descends into the water, passing under the guide roller. From this it rises to and passes between the wringer rolls, after which it travels over the stationary guide and traction roller. From this it passes through the plaiting machine which in vibrating backward and forward, piles the cloth upon the truck or other suitable receiver. The rollers and the wringer rollers are all power driven and hence tend to draw the cloth along the path described. The consequence is that as the cloth is drawn from the truck it passes through the machine and is finally deposited in a pile. The effect of the steamer is to soften and shrink the fibers of the fabric and prepare it to absorb water, and it has been found in practice that the steamer alone will sometimes produce a shrinkage of 10 per cent in the width of the strip. The cloth passing from the steamer down into the water bath becomes saturated with water and the effect of the squeeze rollers is not only to wring a considerable portion of the water from the cloth, but to further soften the fibers and promote the shrinking effect. When wool fibers are examined under the microscope they are seen to have small scales which tend to interlock when the fibers are rubbed together, especially if wet, and this is not only strengthens the fabric, but also shrinks and softens it. As the cloth leaves the squeezer rollers it again passes into the bath and thence to the wringer, the latter removing the surplus water and still further softening the fabric. From the wringer the cloth passes to the piling machine which deposits the cloth in layers. In practice the cloth is permitted thus to

remain piled for a considerable period. This produce "sweating" or heating, due to the weight of the fabric itself and to the heating action of the oil contained in the fabric. After the sweating process has continued for a suitable time the cloth is dried and ready for use in the production of garments.

It will be evident from the foregoing description that the machine is continuous in its operation, taking the cloth from the bolt or pile and subjecting it to the sequence of steps from steaming to piling. As the various parts of the machine are positively geared together, they are certain to operate in synchronism and thus avoid any tendency to unduly stretch the cloth or to permit one portion to gain on another and thus accumulate within the apparatus itself. Furthermore, the effect of the process is uniform throughout the entire length of the piece.

THE CHEMICAL QUESTION

(*Concluded from page* 98.)

life, health, disease and death, and ever clearer recognition of this relation is the strongest force that is raising medicine from the uncertain realm of any art to the safer sphere of an exact science. To many scientific minds it has even become evident that those most wonderful facts of life, heredity and character, must find their final explanation in the chemical composition of the components of life-producing, germinal protoplasm: mere form and shape are no longer supreme but are relegated to their proper place by the housing only of the living matter which functions chemically.

* * * * * *

". . . Of even more vital moment is chemistry in the domain of health. The pitiful calls of our hospitals for local anesthetics to alleviate suffering on the operating table, the frantic appeals for the hypnotic that soothes the epileptic and staves off his seizure, the almost furious demands for remedy after remedy, that came in the early years of the war, are still ringing in the hearts of many of us. No wonder that our small army of chemists grimly determined not to give up the independence in chemistry which war has achieved for us! Only a widely enlightened public, however, can insure the permanence of what farseeing men have started to accomplish in developing the power of chemistry through research in every domain which chemistry touches."

These were the thoughts which were in the minds of men who knew the war and its lessons when they formed the Chemical Foundation.

Mr. President, the information upon which you have been induced to act has been furnished by German agents to an ex-German spy and interpreted by lawyers whose sole knowledge of the war and its lessons is derived from association with German clients. I have not gone on with my disclosures of their activities for I felt that the great, vital issue must not become clouded with personalities; but I beg of you to seek other counsel.

Yours respectfully,

FRANCIS P. GARVAN, President,
CHEMICAL FOUNDATION, INC.

HERBERT HOOVER TO BE AMONG PROMINENT SPEAKERS AT CHEMICAL EXPOSITION

Programs of Various Groups Nearing Completion

Although only a preliminary announcement regarding the program for the Eighth National Exposition of Chemical Industries, which will be held during the week of September 11-16 at the Grand Central Palace, New York, has been made, several well-known public men have already accepted the invitation to speak. Herbert Hoover, Secretary of Commerce, and frequently referred to as "the business man of the Cabinet," will address the Salesmen's Association of the American Chemical Industry, whose annual convention will be held at the Grand Central Palace in conjunction with the Chemical Exposition. Mr. Hoover's deep interest in the American chemical industry, his acquaintance with the problems which beset the industry at this time and his broad knowledge of business conditions will undoubtedly sharpen the desire of thousands to hear his diagnosis of the difficulties of the industry. The fact that he was a well-known engineer before entering public life further qualifies him for the task. He will speak on "Standardization and What It Can Do for the Chemical Industry." Invitations to be present at the Chemical Exposition and hear Hoover will be sent to several thousand chemists and chemical business executives by the Salesmen's Association.

Other speakers who will tend to make the 1922 Chemical Exposition the greatest from the point of view of the caliber of the men who address the meetings will include Wayne B. Wheeler, general counsel for the Anti-Saloon League, and perhaps one of the most widely informed men in the United States today on alcohol and prohibition legislation. Mr. Wheeler will speak on the "Attitude of the Anti-Saloon League Toward Industrial Alcohol." He is active in the rigid enforcement of the Volstead act and the initiation of other measures to make the Eighteenth Amendment effective. His address to the biggest body of chemical men before which he has ever spoken will be awaited with keen interest, especially when it is considered that further alcohol restrictions would jeopardize the entire American chemical industry. The exposition management is planning to take care of a capacity audience when Wheeler speakers.

Further prominent features of the program are being arranged rapidly and include, as well as a very im-

pressive list of speakers for the afternoon meetings in the special auditorium, a number of new and novel ideas which exhibitors have announced will be shown at their booths. Of the 450 exhibitors whom it is estimated will be represented when the exposition opens on September 11, there are many who have added improvements, new products or devices to their lines during the past year, and who use the Chemical Exposition to show them in operation publicly for the first time. From the very first exposition, back in 1915, with its eighty-three exhibitors, when the American chemical industry was just beginning to expand to its present-day proportions, the exposition has been the place where chemical consumers and machinery users have been introduced first to the latest developments. According to a number of the exhibitors, only a limited proportion of which are willing to give out their plans thus far in advance, this year will be no exception to its predecessors.

For the paper mill, the rubber plant, cotton, wool and silk mills, glass factory, metallurgical operations, the paint manufacturer, the flavoring extract maker, the perfumer, the tannery, the manufacturer of medicinals, the dyer, the metal industries, the industrial and college laboratory, the power plant, the gas works, suppliers of city water, the producer of foodstuffs, the cannery, and numerous others—for all of them the latest in chemical products and innumerable phases of plant equipment will be shown. New ideas in centrifugals, special exhibits of microscopes and their application to industrial problems, a whole section to fuel economy devices, something extraordinary in a continuous filter, the biggest and latest kneading machine, a rubber-lined barrel which is practically indestructible, a labeling machine minus the usual drawbacks, wooden storage tanks for mineral acids, diethyl phthalate which outclasses Europe's best, a water-white aniline oil, a comparative exhibit of every quicklime made in the United States with full physical and chemical specifications, American stoneware better than the foreign—each will be only a small part of the big scheme of new ideas which make the exposition the greatest industrial showplace anywhere in the world.

The associations which have definitely arranged to meet and conduct the program during the various sessions of the Exposition include the Technical Association of the Pulp and Paper Industry, the Technical Photographic and Microscopical Society, the Association of Synthetic Organic Chemical Manufacturers of the United States, the American Ceramic Society and the Salesmen's Association of the American Chemical Industry. Each organization will probably conduct the program one afternoon during the week. One afternoon session will be given over to the work of the speakers on standardization. Evening meetings will be taken up by motion pictures exclusively.

Thus far only the programs for the pulp and paper meeting and the standardization group are close to completion, the speakers for other sections not yet being definitely arranged. The program for the Technical Association of the Pulp and Paper Industry includes the following:

"Safety and Efficiency Appliances for the Boiler Plant"—By W. C. Edge, of the Paul B. Huyette Company.

"Trimbey and Tibbitts Proportioning and Metering System for Paper Stock"—By E. J. Trimbey, of the Trimbey Machine Works.

"Rotary Filters for Washing Paper Pulp and for Filtering and Washing Caustic Lime Mud" (illustrated)—By George D. Dickey, of the Industrial Filtration Corporation.

"Efficiencies and Economies in Washing Black Liquor from Digested Soda and Sulphate Stock"—By R. G. Walker, of the Oliver Continuous Filter Company.

"The Merco Nordstrom Plug Valve"—By L. D. Mills, of the Merrill Company.

"Testing Colored Materials for Fastness to Light"—By H. S. Thayer, of the Atlas Electric Devices Company.

"Instruments for Promoting Efficiency in the Paper Mill"—By A. E. Campbell, of the Schaeffer & Budenberg Manufacturing Company.

"The Carbon Dioxide Record of Combustion Efficiency"—By C. G. Phelps, of the Uehling Instrument Company.

"Steel Belts and Their Application to the Solution of Conveying Problems"—By Harry Carlson, of Sandvik Steel, Inc.

"Scott Evaporator as Used in the Paper Mill for Recovering Soda from Spent Liquors"—By H. Austin, of Ernest Scott & Co.

"The V-Notch Meter and Its Application to the Paper Mill"—By L. G. Chase, of the Yarnall-Waring Company.

"Continuous Causticizing with Lime Recovery and Reuse"—By W. D. Mount, of the Glamorgan Pipe & Foundry Company.

"The Grinnell Dryer Applied to Wall Paper and Coated Paper"—By Jerome D. Stein, of the Grinnell Company.

That part of the program which will be given over to standardization includes a number of well-known authorities on the subject. The subjects and speakers include the following:

"Moderation in Standardization"—By W. D. Collins, of the United States Gelogical Survey.

"Standardized Testing Apparatus"—By N. F. Harriman, of the United States Bureau of Standards.

"Discussion of the Reasons for the Varieties of

Sizes and Shapes in Glass Bottles"—By J. G. Jennings, general representative of the Glass Container Association.

"What Has Been Accomplished in the Standardization of Scientific Apparaus"—By J. M. Roberts, Secretary of the Association of Scientific Apparatus Makers of the United States of America.

"Standardization of Fire Clays and Refractories"—By Ross C. Purdy, Secretary of the American Ceramic Society and Chairman of the Committee on Refractories of the American Society of Testing Materials.

"Standardization of Enameled Ware for Chemical Purposes"—By Emerson P. Poste, of the Elyria Enameled Products Company.

The Technical Photographic and Microscopical Society will meet on Thursday, September 14, at 2 p. m. The details of the program have not yet been announced. The time of meeting and programs of the Ceramic Society, Salesmen's Association and the Synthetic Organic Chemical Manufacturers are as yet uncompleted, but will be given out in the near future. All meetings will be held in Grand Central Palace in an auditorium especially provided for this purpose by the Exposition management.

Fall of Lira Makes Difficulties for Italian Dye Makers Who Would Compete with Reparation Colors

American Capital May Be Used to Aid Italy's Industries—Italian Government Expected to Exempt Such Investors from Income Tax—Color Dealers Overstocked—Imports Decline, While Exports Increase—Demand for Wool Colors Greater

By RAFFAELE SANSONE

Genoa, July 10.
Special to The Reporter.

DURING the past six weeks a continued rise was noted in foreign exchange—a rise which brought the value of the United States dollar from 19.50 lire to 22.50, and the value of the English pound from 86.25 lire to 101.50. This had the effect of producing an appreciable increase in all quotations for raw materials received from abroad, thereby placing the producers of dyes at a distinct disadvantage in their competition with Reparation products, since the lira prices of the latter remained practically stationary.

A notable development of the past month was the beginning of negotiations between American capitalists and the Italian Government for the financing of Italian railways as well as some of the industries of Italy. Likewise, the Government here is considering legislation looking to the exemption of such capital from the income tax.

Imports and Exports of Colors

The imports and exports for the first and second six months of the past year are indicated below:

IMPORTS—	First 6 Mos.	Second 6 Mos.
Synthetic organic dyestuffs	2,423 tons	495 tons
Mineral colors	387 "	81 "
Coloring matters	447 "	769 "
Coloring matter extracts	204 "	91 "
Natural indigo	3 "	17 "
Gambier and cochineal	95 "	5 "
Dye woods and tanning woods	3,802 "	3,334 "
Unnamed colors	1,316 "	259 "
Color lakes	.. "	12 "
EXPORTS—		
Synthetic organic dyestuffs	168 tons	102 tons
Mineral colors	50 "	28 "
Coloring matters	1,093 "	1,265 "
Coloring matter extracts	23 "	92 "
Natural indigo	43 "	4 "
Gambier and cochineal	.. "	.. "
Dye woods and tanning woods	43 "	50 "
Unnamed colors	1,051 "	435 "
Color lakes	.. "	.. "

In the above may be noted the great reduction in the importations of synthetic colors, which was brought about by the great quantity of stocks accumulated during 1920 and at the beginning of 1921. It will also be noted that while the imports of coloring earths and of coloring matter extracts, dye woods and tanning woods were greatly reduced, the exports of these products were, on the contrary, increased.

The imports of unnamed colors were reduced to about one-sixth of what they had been during the first half of the past year, whereas the exports, although reduced during the second half of the year, were still much above the imports, showing the activity of the Italian manufacturers of mixtures and of special colors.

A certain increase in the demand for wool colors was noted, and this was created by the necessity of preparing fabrics to be employed for clothing of the

TABLE I

	June 10-July 10 (lire)	June 10 (dollars)	July 10 (dollars)
Naphthol Yellow	40,000—60,000	2,051—3,333	1,777—2,888
Auramine	60,000—70,000	3,076—3,589	2,666—3,111
Orange II	22,000—25,000	1,128—1,281	977—1,111
Nigrosine, water soluble	28,000—35,000	1,435—1,794	1,244—1,555
Nigrosine, soluble in alcohol	30,000—38,000	1,537—1,948	1,333—1,688
Sulphur Black	7,000— 9,500	359— 487	311— 422
Acid Black	30,500—34,500	1,564—1,769	1,355—1,533
Direct Black	30,500—34,500	1,564—1,769	1,355—1,533
Chrome Black	34,000—37,000	1,743—1,897	1,511—1,644
Methylene Blue	75,000—90,000	3,847—4,614	3,333—3,999
Direct Blue	24,500—28,000	1,256—1,435	1,088—1,244
Sulphur Blue	33,500—37,500	1,718—1,923	1,488—1,666
Malachite Green	75,000—90,000	3,846—4,614	3,333—3,999
Acid Green	60,000—70,000	3,076—3,589	2,666—3,111
Direct Green	41,500—54,000	2,122—2,768	1,844—2,400
Bismarck Brown	35,000—41,500	1,794—2,128	1,555—1,844
Magenta (Fuchsine) Crystals	70,000—80,000	3,589—4,102	3,111—3,555
Eosine	50,000—75,000	2,563—3,846	2,222—3,333
Ponceaux	28,500—32,500	1,461—1,666	1,266—1,444
Methyl Violet	65,000—80,000	3,333—4,102	2,888—3,555

TABLE II

	June 10 (lire)	June 10 (dollars)		June 10 (lire)	June 10 (dollars)
Acetate of alumina	1,600	71	Bisulphite of soda, 32 deg. Be	380	16
Chrome alum	3,000	133	Chlorate of potash	3,200	142
Bichromate of potash	5,700	253	Chloride of ammonia	5,000	222
Ferrous sulphate	500	22	Bleaching powder	900	39
Copper sulphate	2,300	102	Nitrite of soda	3,100	137
Tartar emetic	12,000	533	Yellow prussiate of potash	13,000	577
Aniline oil	10,000	444	Yellow prussiate of soda	9,000	399
White refined glycerine	6,400	284	Caustic soda 70/72	2,000	88
Glucose, 45 deg. Be	3,900	173	Silicate of soda, 140 deg. Tw	1,000	44
Hydrogen peroxide	2,100	93	Sodium sulphite	2,600	115
Tannic acid, 60 per cent	20,000	888	Logwood extract	7,500	333
Tartaric acid crystals	10,750	477	Yellow dextrine	3,600	160
Acetic acid, 30 per cent	2,800	124	White dextrine	3,900	173
Hydrochloric acid, 20-21 deg. Be.	300	13	Farina	3,200	142
Formic acid	11,000	488	Kordofan gum	4,900	217
Lactic acid, 80 per cent	4,000	177	Indigo, 25 per cent	22,000	977
Alum	1,000	44	Beta-naphthol	18,000	799
Ammonia, 22 deg. Be	1,450	64	Industrial castor oil	5,250	233

coming winter season, whereas the demand for bright colors—and especially for basic coloring matters—continued on the same scale as usual. The consumption of certain direct colors, among which are included a number of diazotizable and chrome colors, was also very fair. Sulphur blacks of domestic production and of foreign importations were also in demand for producing imitations of aniline black dyed goods, the production of which is continued by some works, although on a more limited scale than formerly. With the colors for silk goods the demand was as usual, and this was also the case with dyes for coloring leather and paper.

Prices of Coal-Tar Dyes

The quotations of war reparation dyes in Table I, per ton in lire and dollars, show the great reductions in the lira and dollar prices at the moment of writing in comparison with the prices prevailing at the beginning of June.

Mordants, Assistants, Dyehouse Products

The fear of strong rises in the prices created by the fall in the value of Italian money values caused a certain number of the consumers of mordants, assistants and dyehouse products to anticipate their orders. For the present, however, sellers of these products have not been boosting their prices, but if a regain in the value of the Italian lira does not follow soon a general rise is to be feared.

Some of the imports of assistants, mordants and dyehouse products were as follows during the last half of 1921: Arsenious acid, 73 tons; hydrochloric acid, 26½ tons; nitric acid, 474½ tons; caustic potash, 906 tons; caustic soda, 9,509 tons; ammonia, 398 tons; calcined carbonate of soda, 3,143 tons; crystallized carbonate of soda, 851 tons; hypochlorite of lime, 500 tons; hypochlorite of soda, 1 ton; calcium chloride, 235 tons; magnesium chloride, 186 tons; chlorate of soda and potash, 153 tons; chromates, 55½ tons; nitrite of soda, 11½ tons; permanganate of potash, 10 tons; sulphate of alumina, 644 tons; sulphate of soda, 2,519 tons; chrome alum, 27½ tons; alum, 6½ tons; sodium sulphide, 1,170 tons; sodium phosphate, 130 tons; hydrosulphites, 54 tons; liquid silicate of soda, 1,206 tons; solid silicate of soda, 1,590 tons; perborates, percarbonates and persulphates, 1½ tons; peroxides, 3 tons; ferrocyanides, 21 tons; peroxide of hydrogen, 44 tons; impure acetic acid, 128 tons; lactic acid, 2½ tons; oxalic acid, 65½ tons; tannic acid, 15 tons; pyrolignite of lime, 138 tons; formaldehyde, 74 tons; anthraquinone, 1½ tons; alpha and beta naphthol, about 1 ton.

Some Quotations

A number of the lira and dollar quotations are given, per ton at Milan, in Table II, page 107.

Private Dyestuff Quotations

Some private quotations of dyestuffs at Genoa were as follows per kilo, showing the struggle against the Reparation products: Nigrosine in crystals, 26 to 30 lire; chrome black, in powder, 34 to 36 lire; acid black, 32 to 35 lire; direct black, 32 to 35 lire; direct green, 48 to 54 lire.

McKERROW RESIGNS FROM NATIONAL TO BECOME ADVERTISING CONSULTANT

H. Gardner McKerrow, who for the past three years has been advertising manager for the National Aniline & Chemical Company, Inc., has resigned, and will engage in business on his own account in New York as an advertising and merchandising consultant, specializing in textile and chemical matters.

During his period of service there is little question but that, owing to his progressive outlook and the importance of the firm with which he was connected, Mr. McKerrow exercised a distince influence upon dyestuff publicity, and The Reporter joins his many friends in heartily wishing him well in his new venture.

URUGUAY REDUCES IMPORT DUTIES ON MORDANT DYES

Uruguay, through a resolution of the Minister of Industries dated May 19, 1922, places chromate of potash and mordant dyes in the raw materials schedule, and dutiable at 5 per cent of the official valuation of 50 pesos per 100 kilos, plus a surtax of 4 per cent of the valuation. These materials have been classified heretofore under drugs and chemicals dutiable at 48 per cent of the valuation of 50 pesos per 100 kilos, plus a surtax of 14 per cent of the valuation. The reduction, in United States currency and weights, is from $14.54 per 100 pounds to $2.11 per 100 pounds.

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Manufacturers of Aniline Colors.

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By William E. Austin

The transfer of furs from Leipzig, Paris and London to the hands of our domestic dyers found the home industry lacking in accurate information and without one standard work in English to fill this gap in our technical literature.

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Chemical Exposition Special

of the

American Dyestuff Reporter

will be published September 11th—the day the Eighth National Exposition of Chemical Industries opens at the Grand Central Palace, New York.

In addition to our regular circulation, this number will be distributed from our booth (No. 743) to all visitors at the Exposition.

Those who are exhibiting should advertise in this issue in order to call attention to their exhibit—and those who do not exhibit can, in this way, advantageously reach all who attend.

As official organ of the American Association of Textile Chemists and Colorists, The Reporter dominates the field of dyeing, bleaching, finishing and allied operations. At the time of the Chemical Exposition, this factor is of unusual importance.

Advertising rates: $100 per page, pro rata for smaller spaces. Regular advertisers should increase their displays for this special number. Others should not fail to be represented.

Write us for additional details.

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for piece dyeing

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Newport Chrome Violet S W D
Newport Chrome Bordeaux R W
Newport Chrome Brown S W R
Newport Chrome Green D S W
Newport Azo Chrome Blue B
Newport Azo Rubine R
Newport Fast Chrome Black R S
Newport Fast Chrome Black G S

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